Evaluation of Conceptual Response Options

BNSF Railyard
Libby, Montana

The Burlington Northern and Santa Fe Railway Company

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Kennedy/Jenks Consultants

EVALUATION OF CONCEPTUAL RESPONSE OPTIONS
BNSF Railyard, Libby, Montana

Prepared for

THE BURLINGTON NORTHERN AND SANTA FE RAILWAY COMPANY

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TABLE OF CONTENTS

TABLE OF CONTENTS

Page Number

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

Kennedy/Jenks Consultants has prepared this report for The Burlington Northern and Santa Fe Railway Company (BNSF) to present a preliminary screening of conceptual response options for the BNSF railyard in Libby, Montana (site). The rail bed structure in the yard has been infiltrated with fine particulates of vermiculite from a local mining operation that loaded the vermiculite into railroad cars for transport. Vermiculite from Libby contains actinolite-tremolite in asbestiform fibers (asbestiform fibers), which is a regulated substance being cleaned up under The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). BNSF has asked Kennedy/Jenks Consultants for assistance to evaluate appropriate response actions for the railroad bed materials containing asbestiform fibers.

U. S. Environmental Protection Agency (EPA) Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (US EPA 1988) was used for guiding the format and information to be addressed herein during preparation of this report. However, due to the expedited schedule, the technology screening, assembly of conceptual response options, evaluation, and cost estimating does not fully address EPA guidance. The completed evaluation more closely resembles an Engineering Evaluation/Cost Analysis (EECA) performed under the federal Superfund Removal Program. For example, the engineer's opinions of probable cost are order of magnitude estimates based upon the information available within the schedule. Therefore, the costs presented do not necessarily comply with EPA guidance for conceptual design stage costs to fall in the +50 percent to -30 percent range. However, the available cost information has been applied in a consistent manner, and the relative ranking of costs is not likely to change significantly.

The information presented in this report is, therefore, intended primarily for screening purposes.

1.2 BACKGROUND

The BNSF facilities in Libby include a transcontinental main line, a yard with four tracks (one including a scale), and several other industrial spurs. The yard is oriented roughly east to west and lies on the northern side of the main line. Figure 1 shows the western half of the yard, and Figure 2 shows the eastern half. A former vermiculite mine operated by W. R. Grace & Company provided mined material for loading into railroad cars at a location east of Libby; the loaded cars were brought to the Libby yard for weighing and shipment to other locations. The cars were switched and organized into trains at the eastern end of the yard. As a result, Kennedy/Jenks Consultants understands the track ballast and adjacent soil at the eastern end of the yard contains asbestiform fibers. Four currently active yard tracks and remaining portions of some former industrial spurs with an aggregate length of approximately 9,000 feet are potentially affected. The site features are shown on Figures 1 and 2, which are adapted from figures previously prepared by EMR, Inc. (EMR).

EPA considers the presence of detectable asbestiform fibers using polarized light microscopy (PLM) by PLM Method 9002, Issue 2 to constitute an action level. The areal extent of visible mica (a potential visual vermiculite indicator) was mapped by EMR and is shown on Figures 1 and 2. However, field mapping by EMR and laboratory testing have not been able to establish a consistent relationship between the observation of visible mica and the presence of asbestiform fibers at the Libby Yard. During soil sampling conducted by EMR in 2003, some samples that contained visible mica did not contain detectable asbestiform fibers when submitted for laboratory analysis, and other areas containing detectable asbestiform fibers did not contain visible mica. This report considers all tracks located parallel to areas of visible mica to be areas potentially requiring response actions.

Previous site investigation and response actions have been conducted by EMR for BNSF. These actions have included visual investigation and random sampling to delineate the area containing asbestiform fibers and an initial response action conducted in 2003 to remove ballast that contains asbestiform fibers by using high efficiency particulate air filter (HEPA) equipped vacuum trucks. The ballast and soil containing asbestiform fibers appears to stop at a layer of apparently native clay. The clay layer underlies the track structure at approximately 8 inches below ground surface (bgs) at the eastern end of the yard and 18 inches bgs at the western end of the zone containing visible mica mapped by EMR. EMR estimates the thickness of the ballast and adjacent soil materials containing asbestiform fibers to average approximately 1 foot along the area of interest.

For cost estimating purposes, we assumed potential asbestos-containing materials will be disposed of at the Lincoln County Landfill, which is an EPA-approved repository.

1.3 SCOPE OF WORK

BNSF has requested that Kennedy/Jenks Consultants assist in identifying and comparing various options for conducting response actions in relation to the asbestiform fibers present in the railyard. We conducted our evaluation as follows:

- Screen potential process options. We developed a list of technologies and process options to implement those technologies and screened them for potential applicability.

- Assemble list of options. We assembled the process options into eight conceptual response options, including a "no further action" option.

- Develop costs. We developed preliminary order of magnitude engineering opinions of probably cost for the options using maps and cost information provided by BNSF and EMR, cost information provided by potential contractors, and our professional judgment. These costs are for planning purposes rather than actual budgets for construction purposes.

- Evaluate options. We evaluated the options for:
  - Protectiveness. This is an evaluation of overall protection of human health and the environment, including ability to minimize or eliminate exposure pathways.
  - Compliance with action levels. This is an evaluation of whether the option responds to the EPA action level for ballast or soil material containing asbestiform fibers.
  - Effectiveness. This is an evaluation of the ability for the option to achieve short-term and long-term cleanup goals.
  - Reduction of toxicity, mobility, and volume. This is an evaluation of the ability of each option to achieve permanent reduction of toxicity, mobility, and volume of ballast and soil material containing asbestiform fibers.
  - Implementability. This includes an evaluation of the technical and administrative feasibility of implementation. It includes anticipated problems such as disruption of service for the railroad yard.
  - Cost effectiveness. This is an evaluation of relative cost for the options.

- Prepare report. We summarized the information in this report with supporting tables.

The work presented comprises preliminary order of magnitude engineering opinions of probably cost and evaluation of conceptual response options provided on an accelerated schedule.

2.0 CLEANUP STANDARDS

2.1 CLEANUP STANDARDS

Based on previous work in Libby, EPA has established that the compounds of concern are asbestiform fibers associated with vermiculite. The asbestiform fibers have been released to site soil and railroad ballast. The action level has been established as the presence of detectable asbestiform fibers using PLM analysis. EMR previously prepared a site map showing presence of visible mica. This was proposed as a proxy for presence of asbestiform fibers in soil. However, comparison of laboratory results to distribution of visible mica provided inadequate correlation. Consequently, visible mica may provide a general understanding of asbestiform fiber distribution, but laboratory testing is needed to provide documentation of asbestiform fiber distribution or removal. For the purpose of this report, we have assumed that the presence of visible mica represents the approximate extent of asbestiform fibers to be addressed by this response action.

Potential human receptors include people who might inhale site dust containing airborne asbestiform fibers or ingest asbestiform fibers from soil or airborne dust. Future potential site receptors include workers (e.g., railroad workers conducting track maintenance or railroad contractors conducting excavation), unauthorized visitors (e.g., motorcycle riders), and other persons present downwind from a dust-generating activity. Removing the inhalation hazard should achieve removal of the ingestion hazard at the same time. Dermal absorption or groundwater ingestion are not considered to be significant pathways.

Potential ecological receptors have not been considered in this report. The exposure risks to animal-related ecological receptors are assumed to be similar to human receptors, and response actions appropriate for human receptors will mitigate risks to ecological receptors. We are not aware of any plant-related ecological risks associated with asbestiform fibers.

Previous site investigation has established that the asbestiform fibers are generally present near ground surface and are seldom present at depths greater than 12 inches bgs. The site reportedly contains a tan clay layer at a depth of approximately 8 inches bgs at the eastern end of the site and approximately 18 inches bgs at the western end of the portion of the site containing asbestiform fibers in ballast or soil material (EMR verbal communication). Kennedy/Jenks Consultants understands this tan clay layer is interpreted to represent native soil, and asbestiform fibers are not anticipated to be present within or below this layer. For the purpose of response option screening, the ballast and soil material above the tan clay layer has been assumed to have an average depth of 12 inches across the site.

2.2 POTENTIAL APPLICABLE, RELEVANT, AND APPROPRIATE REQUIREMENTS

Evaluation of response options has been developed based on the EPA action level (presence of detectable asbestiform fibers) and professional judgment rather than evaluation of site-specific Applicable, Relevant and Appropriate Requirements (ARARs). However, addressing all detectable fibers would address all asbestos-specific ARARs at the site.

2.3 POINTS OF COMPLIANCE

The point of compliance, which is based on the expected exposure pathway, is the point (or points) where cleanup levels established for the site are to be achieved. The exposure pathway is inhalation of asbestiform fibers from dust generated from soil containing asbestiform fibers. Therefore, the point of compliance is the point at which asbestiform fibers are no longer detected in site ballast or adjacent soil.

Based on previous site investigation by EMR, the points of compliance that apply are as follows:

- The southern response action boundary is located between the Main Line Track and Track 1.
- The northern response action boundary is the northern BNSF property line, except that west of Highway 37, BNSF has agreed with EPA to clean up any soil containing asbestiform fibers that is located up to 10 feet north of the BNSF property line, extending onto the former W. R. Grace facility located west of Highway 27. The BNSF property line is approximated on Figures 1 and 2 by the northern Contaminant Reduction Zone (CRZ) line annotated on the Figures by EMR for site work conducted in 2003.
- The western response action boundary is approximately 110 feet west of the quarter-quarter section line shown on Figure 1. This is subject to confirmation by future laboratory sampling.
- The eastern response action boundary is approximately the eastern end of the track switch marking the eastern convergence of Tracks 3, 4, and 5 from Track 1. Where the response action boundary lies parallel to the eastern side of the ladder track (track carrying multiple diverging switches) and Track 5, it is approximated on Figure 2 by the CRZ line annotated by EMR for site work conducted in 2003. This is subject to confirmation by future laboratory sampling.

The eastern and western response action boundaries may be moved during the response action design based on laboratory testing for presence of asbestiform fibers in ballast and soil in the vicinity of those points.

2.4 ESTIMATED AREAS AND VOLUMES OF SITE MATERIAL THAT EXCEED EPA ACTION LEVEL

The area within the response action boundary described above was divided into six segments. The segments are oriented along tracks because the conceptual response options will likely be implemented along track orientations. The segments are shown on Figures 1 and 2 and are described below:

Segment 1 consists of the right-of-way along Track 1, measured from half way between the Main Line Track and Track 1 to the south, and half way between Tracks 1 and 2 to the north. Segment 1 has an area of approximately 40,000 square feet (sq. ft.). Assuming removal to an average depth of 1 foot, it would have an in-place volume of approximately 1,500 cubic yards (cu. yd.).

Segment 2 consists of the right-of-way along Track 2, measured from half way between adjacent Track 1 to the south and Track 3 to the north. At the eastern end of the yard, the boundaries of Segment 2 are extended straight across the yard ladder track to a line parallel to and approximately 8 feet from the ladder track centerline. Segment 2 has an area of 45,200 sq. ft. Assuming removal to an average depth of 1 foot, it would have an in-place volume of approximately 1,700 cu. yd.

Segment 3 consists of the right-of-way along Track 3, measured from half way between adjacent Track 2 to the south and Track 4 to the north. West of the western Track 4 switch, the northern boundary is 8 feet north of the Track 3 centerline. At the eastern end of the yard, the boundaries of Segment 3 are extended straight across the yard ladder track and Track 5 to a line parallel to and approximately 8 feet from the Track 5 centerline. Segment 3 has an area of 42,500 sq. ft. Assuming removal to an average depth of 1 foot, it would have an in-place volume of approximately 1,600 cu. yd.

Segment 4 consists of the right-of-way along Track 4, measured from half way between Track 4 and adjacent Track 3 to the south. The northern segment boundary is approximately 8 feet north of the Track 4 centerline. At the western end of Track 4, the northern boundary line follows the edge of Track 4 until it converges with the northern boundary line of Segment 3. To the east, the northern boundary line is extended until it meets the boundary line for Segment 5. Segment 4 has an area of approximately 33,300 sq. ft. Assuming removal to an average depth of 1 foot, it would have an in-place volume of approximately 1,250 cu. yd.

Segment 5 consists of the right-of-way along Track 5, measured approximately 8 feet either side of the track 5 centerline. The eastern limit of Segment 5 is marked by its intersection with Segment 3. Segment 5 has an area of approximately 14,500 sq. ft. Assuming removal to an average depth of 1 foot, it would have an in-place volume of approximately 550 cu. yd.

Segment 6 consists of the right-of-way along the industrial spurs west of Highway 37 (West Spurs). The southern boundary of Segment 6 is marked by the northern boundaries of Segment 3 and 4, as appropriate. The northern boundary is shown to be approximately 10 feet north of the northern CRZ as shown on Figure 2. The eastern end of Segment 6 ties into the northern boundary of Segment 4 in accordance with soil mapping conducted previously by EMR. Segment 6 has an area of approximately 45,800 sq. ft. Assuming removal to an average depth of 1 foot, it would have an in-place volume of approximately 1,700 cu. yd.

This report evaluates various combinations of capping or removal for the six segments. If all six segments were capped, the area would be approximately 221,300 square feet. If all six segments were excavated to an average depth of 1 foot, the volume would be approximately 8,300 cubic yards.

3.0 IDENTIFICATION AND SCREENING OF PROCESS OPTIONS

Four technologies were considered to implement response actions for soil containing asbestiform fibers. Six process options were developed for these technologies, and one to four variations for each process option were identified. Each variation for the process options was screened for potential applicability. Table 1 summarizes the screening process for the technology process options.

3.1 TECHNOLOGIES AND PROCESS OPTIONS

The following technologies were considered for addressing ballast and soil containing asbestiform fibers as follows:

- No Further Action. This option was retained for comparison to the various conceptual response options.

- Institutional Controls. Institutional controls were considered as a method to control future access to the site or exposure to the ballast and soil containing asbestiform fibers.

- Capping. Capping was considered using three different process options.
  - Raising the tracks in place using conventional railroad maintenance equipment. This would be accomplished by dumping ballast over the track structure, then raising the ties and rails using conventional railroad tamping and lining equipment. This can be accomplished in multiple lifts of approximately 2 inches each until the desired thickness of cap is achieved.
  - Capping without barrier by removing the rails and hardware, but not the ties, and capping the area with an appropriate thickness of ballast or other material. After removal of the rails, no barrier layer of geotextile or other substance would be placed between the soil containing asbestiform fibers and the overlying cap.
  - Capping with barrier by removing the rails and hardware, but not the ties, placing a barrier layer of geotextile and capping the area with an appropriate thickness of ballast or other material.
  - Capping with barrier by removing rails, hardware, and ties, placing a barrier layer of geotextile and capping the area with an appropriate thickness of ballast or other appropriate fill.

- Excavation. Excavation would be accomplished by removing the rails, hardware, and ties and excavating the soil containing asbestiform fibers. This is assumed to be able to achieve total removal by excavation to an approximate depth of 12 inches. The excavated soil would be transported to an EPA-approved repository (i.e., the Lincoln County Landfill), and the excavated area would be backfilled with ballast or other appropriate fill.

3.2 PROCESS OPTION VARIATIONS AND SCREENING CONSIDERATION

The process option variations identified above are more fully developed below with screening comments.

- No further action. This option is retained for comparison to the other conceptual response options.

- Institutional controls. Institutional controls include deed restrictions, fencing, BNSF instructions to employees, or other legal or procedural controls to limit exposure to soil containing asbestiform fibers. Institutional controls are potentially applicable as a component to each of the conceptual response options, including the "No Further Action" option.

- Raising tracks in place by 6 inches. This would be accomplished in three 2-inch lifts, would place the base of the ties approximately 6 inches higher than current conditions, and would place ballast rock between the ballast and soil containing asbestiform fibers and the track structure. Based on discussion with a BNSF roadmaster, a ballast depth of 8 inches beneath the ties is needed to facilitate future tie replacement without disturbing the underlying material. This variation is not appropriate because the separation between existing and new track elevation is not sufficient.

- Raising tracks in place by 8 inches. This would be accomplished in four 2-inch lifts, would place the base of the ties approximately 8 inches higher than current conditions, and would place ballast rock between the ballast and soil containing asbestiform fibers and the track structure. Raising the track by this method does not allow placing of a barrier between the soil containing asbestiform fibers and the overlying new ballast because no void is created that would allow barrier placement. This variation is potentially applicable. Options to raise the track will need to be evaluated during the design phase to allow adequate vertical clearance between the rails and the Highway 37 overpass, to provide track elevation that is compatible with the main line switch at the eastern end of the yard, and to evaluate conflicts with respect to existing structures such as railroad bridges or culverts.

- Raising tracks in place by 12 inches. This would be accomplished in six 2-inch lifts, would place the base of the ties approximately 12 inches higher than current conditions, and would place ballast rock between the ballast and soil containing asbestiform fibers and the track structure. This variation allows the minimum 8-inches separation beneath the base of the tie plus an additional layer of ballast for a buffer zone. Raising the track by this method does not allow placing of a barrier between the soil containing asbestiform fibers and the overlying new ballast because no void is created that would allow barrier placement. This variation is potentially applicable. Options to raise the track will need to be evaluated during the design phase to allow adequate vertical clearance between the rails and the Highway 37 overpass, to provide track elevation that is compatible with the main line switch at the eastern end of the yard, and to evaluate conflicts with respect to existing structures such as railroad bridges or culverts.

- Capping without barrier. This would be accomplished by removing rails and hardware, but leaving ties in place, and capping with ballast or other suitable fill. Leaving old ties in place beneath locations where new track is to be constructed may not be desirable because eventual disintegration of the old ties will cause differential settlement of the overlying track structure, and would not provide protection against migration of the ballast and soil containing asbestiform fibers into the overlying clean fill. Therefore, this variation is not appropriate.

- Capping with barrier, leaving ties. This would be accomplished by removing rails and hardware, but leaving ties in place, placing a barrier of geotextile or other material, and capping with ballast or other suitable fill. Leaving old ties in place beneath locations where new track is to be constructed may not be desirable because eventual disintegration of the old ties will cause differential settlement of the overlying track structure. However, the geotextile would provide some structural benefits and would provide additional protection against migration of the ballast and soil containing asbestiform fibers into the overlying clean fill. This variation is potentially applicable.

- Capping with barrier, removing ties. This would be accomplished by removing rails, hardware, and ties, placing a barrier of geotextile or other material, and capping with ballast or other suitable fill. Removing old ties beneath locations where new track is to be constructed will minimize potential for differential settlement of the overlying track structure. This variation is potentially applicable.

- Excavation. This would be accomplished by removing rails, hardware, and ties, excavating soil containing asbestiform fibers to an average depth of 12 inches, and backfilling with ballast or other suitable fill. If asbestiform fibers are found at greater depths where excavation becomes impractical, institutional controls would be provided to address residual contamination. This variation is potentially applicable.

4.0 DESCRIPTION OF CONCEPTUAL RESPONSE OPTIONS

The variations of the process options were combined into eight conceptual response options using professional judgment to obtain a wide range of options that provide for continued use of this active railyard. The conceptual process options are shown in Table 2 and are described below.

4.1 OPTION 1 – NO FURTHER ACTION WITH INSTITUTIONAL CONTROLS

This option is retained for evaluation against the other options. It incorporates institutional controls. Relevant institutional controls would include deed restrictions, fence construction, and institution of internal railroad procedures to provide:

- Installation of fencing along the northern and southern site boundaries to limit unauthorized site access.
- A Record Survey would be conducted to provide the property boundaries to which the institutional controls would apply. This Record Survey also provides the basis for documenting the work constructed under any of the other options.
- All future track work and excavation at the site under this option would be conducted with appropriate air quality monitoring.
- All railroad employees and contractors performing work at the site under this option would have appropriate health and safety training and equipment, and work would be conducted using an appropriate health and safety plan and appropriate personal protective equipment
- Future excavation or ballast and soil materials removed that contain detectable asbestiform fibers would receive appropriate disposal.

4.2 OPTION 2 – RAISE FOUR TRACKS IN PLACE

This option calls for raising Tracks 1, 2, 3, and 4 in place. Two variations are identified, to raise the tracks by 8 inches and by 12 inches. Rails and hardware would be removed from Track 5 and the industrial spurs located west of Highway 37 (West Spurs as shown on Figure 1), and those areas would be capped.

4.2.1 Option 2A – Raise Four Tracks by 8 Inches, Remove and Cap Track 5 and West Spurs

Option 2A calls for raising Tracks 1, 2, 3, and 4 in place by 8 inches. Conventional railroad equipment will be used to place ballast and raise the track structure in four 2-inch lifts. After placement of the first ballast lift, the rails and ties will be pressure washed to minimize presence of residual asbestiform fibers on the track materials. Water from pressure washing will be allowed to infiltrate, and then capping materials will be placed over the infiltrated water and residual asbestiform fibers. Additional ballast placement and track lifts will be made as needed to raise the tracks by 8 inches. Based on the current condition of the tracks and discussion with the local BNSF Roadmaster, we assume that approximately 50 percent of the ties will need to be replaced during the track-raising process. The freight car scale pit will need to be decontaminated by vacuuming and possibly pressure washing to remove asbestiform fibers. Solid wastes will be disposed of at an approved repository. The scale pit will be decommissioned in order to allow Track 4 to be raised and remain in service.

Beyond the end of the segment requiring the response action, the track elevation will be tapered back to existing track elevation. This will extend the total length of track being raised by 300 feet for Track 1 at the eastern end of the site (the available distance from the end of the site to the main line switch). At the western end of the site, tapering will be conducted at a rate of 2 inches per 100 feet, which will give a track grade of 0.17 percent. This will extend the total length of track being raised by 400 feet at the western end of the site for each of Tracks 1 and 2 and by 250 feet for Track 3 until it converges with Track 2. A different rate for tapering the track elevation may be selected during design phase, but the rates described above have been used consistently among the conceptual response options.

Rails and hardware will be removed from Track 5 and West Spurs, leaving the ties in place. Removed rail will be pressure washed to remove residual asbestiform fibers and will be stockpiled. The footprint of the removed tracks and adjacent areas (including the zone of infiltrated wash water and residual asbestiform fibers) will be capped by placing a geotextile barrier and backfilling with 12 inches of suitable material, such as crushed rock road sub-base.

Where applicable, institutional controls as described in Section 4.1 will be implemented to protect future workers that may perform track maintenance or excavate beneath the cap.

4.2.2 Option 2B – Raise Four Tracks by 12 Inches, Remove and Cap Track 5 and West Spurs

Option 2B calls for raising Tracks 1, 2, 3, and 4 in place by 12 inches. Conventional railroad equipment will be used to place ballast and raise the track structure in six 2-inch lifts. After placement of the first ballast lift, the rails and ties will be pressure washed to minimize presence of residual asbestiform fibers on the track materials. Additional ballast placement and track lifts will be made as needed to raise the tracks by 12 inches. Based on the current condition of the tracks, we assume that approximately 50 percent of the ties will need to be replaced during the track-raising process. The freight car scale pit will need to be decontaminated and decommissioned in order to allow Track 4 to be raised and remain in service.

Beyond the end of the segment requiring the response action, the track elevation will be tapered back to existing track elevation. This will extend the total length of track being raised by 300 feet for Track 1 at the eastern end of the site (the available distance from the end of the site to the main line switch). At the western end of the site, tapering will be conducted at a rate of 2 inches per 100 feet, which will give a track grade of 0.17 percent. This will extend the total length of track being raised by 600 feet at the western end of the site for each of Tracks 1 and 2 and by 250 feet for Track 3 until it converges with Track 2. A different rate for tapering the track elevation may be selected during design phase.

Rails and hardware will be removed from Track 5 and West Spurs, the rails pressure washed, and the area capped as described in Section 4.2.1.

Where applicable, institutional controls as described in Section 4.1 will be implemented to protect future workers that may perform track maintenance or excavate beneath the cap.

4.3 OPTION 3 – RAISE TWO TRACKS IN PLACE

This option calls for raising Tracks 1 and 2 in place. Two variations are identified, to raise the tracks by 8 inches and by 12 inches. Rails and hardware would be removed from Tracks 3, 4, 5, and the West Spurs, and those areas would be capped.

4.3.1 Option 3A – Raise Tracks 1 and 2 by 8 Inches, Remove Cap Tracks 3, 4, 5, and West Spurs

Option 3A calls for raising Tracks 1 and 2 in place by 8 inches. Conventional railroad equipment will be used to place ballast and raise the track structure in four 2-inch lifts. After placement of the first ballast lift, the rails and ties will be pressure washed to minimize presence of residual asbestiform fibers on the track materials. Additional ballast placement and track lifts will be made as needed to raise the tracks by 8 inches. Based on the current condition of the tracks, we assume that approximately 50 percent of the ties will need to be replaced during the track-raising process.

Beyond the end of the segment requiring the response action, the track elevation will be tapered back to existing track elevation as described in Section 4.2.1.

Rails and hardware will be removed from Tracks 3, 4, 5, and West Spurs, the rails pressure washed, and the area capped as described in Section 4.2.1. The freight car scale pit will need to be decontaminated and backfilled to eliminate a potential safety concern.

Where applicable, institutional controls as described in Section 4.1 will be implemented to protect future workers that may perform track maintenance or excavate beneath the cap.

4.3.2 Option 3B – Raise Tracks 1 and 2 by 12 Inches, Remove Cap Tracks 3, 4, 5, and West Spurs

Option 3B calls for raising Tracks 1 and 2 in place by 12 inches. Conventional railroad equipment will be used to place ballast and raise the track structure in six 2-inch lifts. After placement of the first ballast lift, the rails and ties will be pressure washed to minimize presence of residual asbestiform fibers on the track materials. Additional ballast placement and track lifts will be made as needed to raise the tracks by 12 inches. Based on the current condition of the tracks, we assume that approximately 50 percent of the ties will need to be replaced during the track-raising process.

Beyond the end of the segment requiring the response action, the track elevation will be tapered back to existing track elevation as described in Section 4.2.2

Rails and hardware will be removed from Tracks 3, 4, 5, and West Spurs, the rails pressure washed, and the area capped as described in Section 4.2.1. The freight car scale pit will need to be decontaminated and backfilled to eliminate a potential safety concern.

Where applicable, institutional controls as described in Section 4.1 will be implemented to protect future workers that may perform track maintenance or excavate beneath the cap.

4.4 OPTION 4 – REMOVE ALL TRACKS, PLACE BARRIER, REBUILD TRACKS 3 AND 4, CAP TRACKS 1, 2, 5, AND WEST SPURS

Option 4 calls for removing rails and hardware from Tracks 1, 2, 3, 4, 5, and the West Spurs. Ties will be removed beneath the footprint where new track is to be constructed. Ties will be left in place beneath the other tracks. The removed tracks and adjacent areas will be capped by placing a geotextile barrier. Tracks 3 and 4 will be rebuilt using a minimum of 8 inches of ballast between the ties and the geotextile barrier. Tracks 3 and 4 will be tied into the remaining segments of Tracks 1 and 2 west of the work zone, as shown on Figure 3. The freight car scale pit will need to be decontaminated and decommissioned in order to allow Track 4 to be rebuilt.

Beyond the end of the segment requiring the response action, the track elevation will be tapered back to existing track elevation. This will extend the total length of track being raised by 300 feet for Track 1 at the eastern end of the site (the available distance from the end of the site to the main line switch). At the western end of the site, tapering will be conducted at a rate of 2 inches per 100 feet, which will give a track grade of 0.17 percent. This will extend the total length of track being raised by 400 feet at the western end of the site where rebuilt Tracks 3 and 4 tie in to Tracks 1 and 2. A different rate for tapering the track elevation may be selected during design phase.

Removed rail will be pressure washed to remove residual asbestiform fibers and will be stockpiled. The footprint of the removed tracks and adjacent areas (other than Tracks 3 and 4 as described above) will be capped by placing a geotextile barrier and backfilling with 12 inches of suitable material, such as crushed rock road sub-base.

Where applicable, institutional controls as described in Section 4.1 will be implemented to protect future workers that may perform track maintenance or excavate beneath the cap.

4.5 OPTION 5 – REMOVE ALL TRACKS, EXCAVATE AND REBUILD TRACKS 3 AND 4, PLACE BARRIER AND CAP TRACKS 1, 2, 5, AND WEST SPURS

Option 5 calls for removing rails and hardware from Tracks 1, 2, 3, 4, 5, and the West Spurs. Ties will be removed beneath the footprint where new track is to be constructed. Ties will be left in place beneath the other tracks. Soil containing asbestiform fibers will be excavated to an average depth of 12 inches beneath Tracks 3 and 4 and the transition zone to tie them in to Tracks 1 and 2 at the western end of the site. The excavated footprint will be backfilled to original ground surface using ballast or other suitable compacted fill. Tracks 3 and 4 will be rebuilt and will be tied into the remaining segments of Tracks 1 and 2 west of the work zone, as shown on Figure 3. The freight car scale pit will need to be decontaminated and decommissioned in order to allow Track 4 to be rebuilt.

Beyond the end of the segment requiring the response action, the track elevation will be tapered back to existing track elevation. This will extend the total length of track being raised by 300 feet for Track 1 at the eastern end of the site (the available distance from the end of the site to the main line switch). At the western end of the site, tapering will be conducted at a rate of 2 inches per 100 feet, which will give a track grade of 0.17 percent. This will extend the total length of track being raised by 400 feet at the western end of the site where rebuilt Tracks 3 and 4 tie in to Tracks 1 and 2. A different rate for tapering the track elevation may be selected during design phase.

Removed rail will be pressure washed to remove residual asbestiform fibers and will be stockpiled. The footprint of the removed tracks and adjacent areas will be capped by placing a geotextile barrier and backfilling with 12 inches of suitable material, such as crushed rock road sub-base.

Where applicable, institutional controls as described in Section 4.1 will be implemented to protect future workers that may excavate beneath the cap.

4.6 OPTION 6 – REMOVE AND EXCAVATE ALL TRACKS, REBUILD TRACKS 3 AND 4, BACKFILL REMAINDER

Option 6 calls for removing rails, hardware, and ties from Tracks 1, 2, 3, 4, 5, and the West Spurs. Soil containing asbestiform fibers will be excavated to an average depth of 12 inches. Tracks 3 and 4 will be rebuilt and will be tied into the remaining segments of Tracks 1 and 2 west of the work zone, as shown on Figure 3. The freight car scale pit will need to be decontaminated and decommissioned in order to allow Track 4 to be rebuilt.

Beyond the end of the segment requiring the response action, the track elevation will not need to be tapered back to existing track elevation because the excavation will allow reinstallation of the track at the original grade.

Removed rail and ties will be pressure washed to minimize the presence of residual asbestiform fibers and will be stockpiled. The footprint of the removed tracks and adjacent areas will not need to be capped but will be backfilled with 12 inches of suitable material, such as crushed rock road sub-base. This will bring ground surface back to the evaluation of the rebuilt tracks.

Institutional controls will not be necessary because the soil containing asbestiform fibers will be removed from the site. However, if asbestiform fibers remain present below 12 inches and excavation becomes impractical, institutional controls could be implemented to address any residual contamination.

5.0 DEVELOPMENT OF ENGINEER'S OPINIONS OF PROBABLE COST

Engineer's opinions of probable cost were generated for each of the conceptual response options shown on Table 2. Table 3 presents the relative ranking of the conceptual response options, based on the indicated engineer's cost opinions. The associated spreadsheets for developing the opinions of probable cost are enclosed in Appendix A. Values used to develop the relative cost ranking were based on information provided by BNSF and potential contractors, cost or bid values obtained in 2001 for conducting similar work at a site in Butte, Montana, information obtained from R. S. Means, and Kennedy/Jenks Consultants' experience and professional judgment.

The engineer's opinions of probable cost were based on information collected within a limited time frame and, therefore, do not necessarily fall within the recommended EPA range of +50 percent/-30 percent for Feasibility Study-based cost estimating. However, costs have been estimated using consistent values and should reasonably represent the relative implementation costs of the conceptual response options compared to each other.

The schedule for the report did not allow full development of the potential costs, and units constructed may vary from units described in this report. Therefore a construction contingency of 35 percent has been added to the cost. This includes 10 percent markup for a general contractor if the Design Engineer is retained as the general contractor.

The contractor will need to pay 1 percent Montana Gross Receipts Tax.

The Total Construction Cost Opinion is the sum of the construction, the construction contingency, and the Montana Gross Receipts Tax.

Design engineering costs have been estimated at 12.5 percent of the Total Construction Cost Opinion. This will include design and preparation of the Construction Completion Report.

Construction management costs have been estimated at 12.5 percent of the Total Construction Cost Opinion.

The Total Engineer's Cost Opinion is the sum of the Total Construction Cost Opinion plus the design engineering cost, plus the construction management cost.

Some potentially significant costs were not calculated in the estimates, such as:

- Soil sampling to confirm the area of the response action. This may be needed to confirm whether the response action area based on visible mica is adequate to implement the construction without additional modification of the response action boundaries.

- Long-term monitoring costs have not been included. Long-term monitoring costs would likely be similar for all options except Option 6 (full excavation and backfilling) and, therefore, are not likely to change the cost ranking of options significantly.

The following costs were assigned based on professional judgment:

- Based on professional judgment, Kennedy/Jenks Consultants has assigned a cost of $140,000 for development and implementation of institutional controls. This includes $80,000 for fencing, $20,000 for a Record Survey and $40,000 for administrative controls. Institutional controls would probably require preparation of surveyed maps to append to the property title. The Record Survey would provide the required maps, and would also provide the basis for documenting construction activities. Internal railroad documents and procedures would need to be developed and implemented to provide for the health and safety of railroad employees or contractors engaging in excavation or track maintenance. The cost of implementing institutional controls would be similar for all options except Option 6 (full excavation and backfilling), in which case institutional controls would not be needed unless residual contamination remained.

- Based on professional judgment, Kennedy/Jenks Consultants has assigned a cost of $25,000 to decontaminate and decommission the freight car scale pit located on Track 4. This estimate assumes that the pit will need to be decontaminated and the waste taken to the local asbestos repository. The scale machinery will need to be removed, the upper portion (assume 1 foot) of the pit walls will be demolished, and the pit will be backfilled and compacted with suitable material. Options 2A, 2B, 4, 5, and 6 will require Track 4 to be raised or rebuilt over the top of the pit footprint. Options 3A and 3B will only require the pit to be backfilled and compacted sufficiently to allow placement of a cap without significant future subsidence at the pit footprint. The $25,000 cost does not provide for removal of the scale shack, which is not anticipated to interfere with construction of the various options.

Other significant assumptions include:

- The cost of $100 per linear foot for constructing new railroad track was provided by BNSF. This uses new ties, and welded rail. It also includes the cost of acquiring and placing the ballast directly associated with laying the track. This cost may also be impacted significantly by the cost of steel, which is currently rising at a rapid rate (April 2004). Variation in the cost of this activity will have noticeable impact on the cost of the response option.

- The cap thickness for non-track areas is assumed to be 12 inches. EPA may accept a different thickness. For example, rock caps constructed in Butte, Montana, for the Railroad Beds Time Critical Removal Action (TCRA) have 6-inch minimum thickness. A cap thickness of 12 inches was used for consistency between options.

- For consistent cost comparison, the non-track caps have been assumed to be crushed rock road sub-base to provide a surface upon which vehicles can drive to perform railroad maintenance functions. A different capping material may be selected during response action design.

- The depth of removal of excavated ballast and soil containing asbestiform fibers is assumed to average 1 foot across the site. This is based on the reported depth to the tan clay layer, which EMR indicates is approximately 8 inches bgs at the east end of the response action area, and 18 inches at the west end of the response action area. If the average depth of excavation is greater than 1 foot, disposal costs could increase significantly for Option 5 and Option 6. On the other hand, because the method of release was surface spillage, it may be possible, through a systematic soil testing program, to reduce the depth of removal.

- Solid wastes are assumed to be disposed of at the Lincoln County Landfill, which EPA has designated as an appropriate repository. The hauling costs were based on estimates from R. S. Means, a distance of 20 miles round trip to the landfill, and the tip fee of $32.00 per ton.

- It is assumed that wash water from pressure washing rails and ties will infiltrate at the point of washing, and that wash water and the washed-off asbestiform fibers will subsequently be capped with ballast, geotextile where used, and other capping materials.

6.0 EVALUATION OF CONCEPTUAL RESPONSE OPTIONS

This section presents a comparative analysis between the Conceptual Response Options in terms of the following criteria: protectiveness; compliance with action levels; effectiveness (both short-term and long-term); ability to reduce toxicity, mobility, and volume of asbestiform fibers; implementability; and relative cost. An ARARs analysis has not been performed, nor have the options been evaluated for Agency or community acceptance. The relative advantages and disadvantages of each conceptual response option are discussed. Table 4 presents a visual summary of the comparison.

6.1 OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

Protectiveness was judged with respect to the primary human health exposure pathway, which is inhalation or ingestion of asbestiform fibers from airborne dust. For compounds of concern at this site, protection of the environment will likely be met if human health is protected, because the primary exposure pathway for environmental receptors would also be inhalation or ingestion of airborne asbestiform fibers by animals.

Option 1 (no further action) provides limited protection to human health by educating employees and attempting to limit trespassers. There is no protection from windblown dust.

The capped non-track areas of Options 2A, 2B, 3A, 3B, 4, and 5 are protective of human health and the environment by covering ballast and soil containing asbestiform fibers with a geotextile barrier and a cap. This will limit asbestiform fibers from becoming airborne under normal conditions, and the geotextile will provide a warning layer between cap material and underlying soil. Institutional controls will identify areas where appropriate health and safety precautions need to be implemented prior to excavation activities.

Options 2A and 3A have moderate protectiveness because these two options may allow future recontamination due to the absence of a barrier to separate ballast and soil containing asbestiform fibers from overlying ballast, and the 8-inch ballast thickness must be maintained to prevent mixing with underlying soil. If asbestiform fibers become mixed into the ballast, future track maintenance activities may generate airborne asbestiform fibers.

Options 2B and 3B provide moderate to high protectiveness because the 12-inch ballast thickness provides an extra buffer zone to prevent the potential disturbance of underlying ballast and soil during routine track maintenance.

Option 4 provides a barrier between the ballast and soil containing asbestiform fibers and the overlying ballast. This option provides high protectiveness and will be protective of human health as long as a sufficient thickness (i.e., at least 8 inches) of ballast is maintained beneath the ties to protect barrier integrity during routine track maintenance activities.

Option 5 provides high protectiveness, because the ballast and soil containing asbestiform fibers will be removed from beneath the track structure. Therefore, mixing of ballast with underlying soil containing asbestiform fibers during track maintenance will be prevented.

Option 6 provides high protectiveness, because all ballast and soil containing asbestiform fibers will be removed from the site. Institutional controls will be needed only if residual contamination remains.

6.2 COMPLIANCE WITH ACTION LEVELS

An ARARs analysis has not been performed for the options. However, the options are rated in relation to the established compound-specific action level of no detectable fibers. Option 1 (no further action) does not address the action level of no detectable asbestiform fibers. All other options address this action level.

6.3 EFFECTIVENESS

6.3.1 Short-Term Effectiveness

Short-term effectiveness provides a ranking of the options for protectiveness of receptors during construction. This effectively amounts to preventing generation of airborne dust containing asbestiform fibers.

Option 1 does not provide short-term effectiveness. Institutional controls would be insufficient to protect receptors from wind-generated dust.

Options 2A, 2B, 3A, 3B, 4, and 5, all can achieve high short-term effectiveness through dust control. Option 6 can achieve moderate to high short-term effectiveness through dust control. Option 6 is ranked lower because the greater amount of excavation creates greater potential to generate dust. The ability to control dust during construction has already been demonstrated during previous site activities. This is accomplished by pre-wetting all soil material prior to disturbance and by misting water in the work zone to capture any dust particles. EMR indicates that those engineering controls resulted in no airborne asbestiform fibers being detected above the EPA AHERA indoor clearance level of 70 structures per square millimeter from air monitoring conducted at the edge of the work zone during 2003 construction activities.

6.3.2 Long-Term Effectiveness and Permanence

Long-term effectiveness provides a ranking of the options for protectiveness of receptors following completion of construction and for permanence of the option. This evaluates the ability of the option to minimize or eliminate re-contamination of cap material to minimize or eliminate disturbance of asbestiform fibers during future track maintenance or the risk of generating dust from soil containing asbestiform fibers in the future when site excavation or other activities might be conducted.

Option 1 does not provide long-term effectiveness. Institutional controls would provide limited protection and would not address vehicle-generated or wind-generated dust.

Options 2A, 2B, 3A, and 3B provide low to moderate protectiveness because they do not allow placement of a barrier between the ballast and soil containing asbestiform fibers and the overlying new track ballast. This could allow mixing of underlying ballast and soil into the new ballast. All four options are subject to mixing during placement of the first two or three new ballast layers and subsequent track lifts. Options 2A and 3A provide low protectiveness. They are more susceptible to mixing within the zone of future track rehabilitation because the total depth of new ballast is 8 inches. BNSF personnel have identified this depth as the minimum necessary depth of ballast beneath the tie to avoid disturbing underlying material during tie-tamping maintenance activities. Options 2B and 3B offer moderate protectiveness from mixing because they add additional new ballast thickness beneath the ties.

Option 4 provides moderate to high long-term effectiveness and permanence because a geotextile barrier will be installed between the ballast and soil containing asbestiform fibers and the overlying new ballast. Furthermore, the new ballast can be installed to a thickness of 8 inches prior to placing and tamping ties. The geotextile barrier will significantly reduce the ability of underlying ballast and soil to mix with the new ballast, and placing the full thickness (i.e., 8 inches) of new ballast will provide sufficient clearance between the ties and underlying ballast/soil to minimize the risk of tearing the geotextile or otherwise mixing old ballast/soil into the new ballast during future tie-tamping maintenance activities.

Option 5 provides a high degree of long-term effectiveness and permanence by removing the ballast and soil containing asbestiform fibers from beneath the footprint of the rebuilt track. Therefore, future tie-tamping maintenance activities will not risk mixing new ballast with underlying old ballast and soil containing asbestiform fibers.

Options 2A, 2B, 3A, 3B, 4, and 5 all provide a high degree of long-term effectiveness and permanence for the areas where tracks are removed, a geotextile barrier is placed, and a cap is installed. The geotextile barrier will minimize the risk of mixing between ballast and soil containing asbestiform fibers and the overlying cap. Institutional controls will provide a means to control future excavation activities within the capped areas.

Option 6 provides a high degree of long-term effectiveness and permanence. This will be achieved by excavating and removing the ballast and soil containing asbestiform fibers.

6.4 PERMANENT REDUCTION OF TOXICITY, MOBILITY, AND VOLUME

None of the options will reduce asbestiform fiber toxicity. However, most options will reduce asbestiform fiber mobility and/or volume at the site. None of the options permanently reduce toxicity, mobility, or volume through treatment.

Option 1 will not reduce asbestiform fiber toxicity, mobility, or volume.

Options 2A, 2B, 3A, and 3B place a geotextile barrier between the soil containing asbestiform fibers and overlying capping material where tracks have been permanently removed. This will reduce asbestiform fiber mobility but will not reduce asbestiform fiber volume. These four options will reduce asbestiform fiber mobility beneath the active track compared to the no action alternative but not as well as Options 4, 5, and 6. Options 2A, 2B, 3A, and 3B are given a low ranking for this category, because they do not reduce toxicity volume and may not provide reduction of asbestiform fiber mobility.

Option 4 places a geotextile barrier the soil containing asbestiform fibers and overlying capping material where tracks have been permanently removed. Option 4 will also place a geotextile barrier between the soil containing asbestiform fibers and the ballast for the rebuilt track. This option receives a moderate ranking, because it will reduce asbestiform fiber mobility to a greater degree than options 2A, 2B, 3A, or 3B but will not reduce asbestiform fiber volume.

Option 5 excavates and removes soil containing asbestiform fibers from the footprint of the rebuilt track. Option 5 also will place a geotextile barrier between the soil containing asbestiform fibers and overlying capping material where tracks have been permanently removed. This will reduce asbestiform fiber mobility and volume and, therefore, receives a moderate to high ranking.

Option 6 excavates and removes all soil containing asbestiform fibers. Therefore, it results in a large reduction of asbestiform fiber volume and receives a high ranking.

6.5 IMPLEMENTABILITY

All options can probably be implemented. However, Options 2A, 2B, 3A, 3B, 4, and 5 raise track elevations, which may present specific difficulties and warrant further engineering evaluation beyond the limits of this report. Further design consideration will need to be given to these options to resolve whether they are compatible with existing railroad infrastructure. Specifically, options that raise track elevation:

- Must maintain adequate clearance beneath overhead obstacles, particularly the Highway 37 overpass and a pedestrian overpass located just beyond the eastern end of the yard. The pedestrian overpass is probably outside the likely zone of work.

- Must not adversely impact other track-related structures. At the eastern end of the yard, this means the elevation of the raised track must be compatible with the elevation of the track switch between the main line and the yard. At the western end of the yard, the elevated track may or may not impact structures that cannot be raised, such as railroad bridges over surface water drainages. The bridges at the western end of the yard are located beyond the currently known extent of detectable asbestiform fibers, based on the area of visible mica shown on Figures 1 and 2.

Option 5 could be implemented without raising the tracks above existing grade, but a topographic low would be created along rebuilt Tracks 3 and 4 because the adjacent areas would receive a 12-inch cap. This creates runoff issues as well as safety issues for trainmen working around moving equipment on uneven ground. If vertical clearance issues require Tracks 3 and 4 to be reconstructed at original grade, drainage ditches may need to be constructed. The option could still be implemented, but at a greater expense than currently calculated.

Option 6 is implementable and does not appear to present clearance or other infrastructure issues because the soil beneath the track structure will be removed, allowing placement of ballast without raising the elevation of the rebuilt tracks.

All options except Option 1 will have an effect upon railroad yard operations because tracks will be taken out of service during construction. Some options will reduce the final yard size to two active tracks. We understand that BNSF considers this to be acceptable based on current usage of the yard. The impacts to yard operation can be compensated to some degree by staging removal and rebuilding of tracks. In fact, it will be desirable to maintain some active tracks in the yard at all times because the most efficient way to unload and spread track ballast is from hopper cars located in the immediate vicinity of the work. In addition, necessary switching of railroad cars may be diverted temporarily to tracks located on the southern side of the main line or by switching the cars at the far western end of the yard, beyond the limits of the work. However, switching at the western end of the yard will require safety precautions to prevent cars from rolling into the work zone.

6.6 COST EFFECTIVENESS

The cost of implementing the various options will increase from Option 1 through Option 6 as shown on Tables 3 and 4. The costs associated with Options 2A and 3A have a similar range because the cost of raising track is roughly equivalent to the cost of capping. The costs associated with Options 2B and 3B have a similar range, but higher than 2A and 3A because of the cost for additional ballast. The cost for Option 4 increases due to the added expense of rebuilding tracks. The costs of Options 5 and 6 increase in proportion to the amount of soil that must be excavated and taken to an EPA-approved repository (i.e. the Lincoln County Landfill) for disposal.

7.0 SUMMARY

Review of the eight conceptual response options are as follows and are summarized on Table 4:

- Option 1 does little to mitigate risks at this site.
- Options 2A, 2B, 3A, and 3B. All four options present a risk that the ballast may become fouled in the future from underlying soil containing asbestiform fibers and, therefore, could generate dust containing asbestiform fibers during routine track maintenance operations. Furthermore, all four options may present implementation issues with respect to vertical clearance above tracks or other compatibility issues with existing railroad infrastructure.
- Option 4 provides acceptable protectiveness and long-term effectiveness but may present implementation issues with respect to vertical clearance above tracks or other compatibility issues with existing railroad infrastructure.
- Option 5 provides high protectiveness and long-term effectiveness, but the cost is higher due to expense of excavating and disposing of soil. This option may have the same implementation issues as options 2A, 2B, 3A, 3B, and 4 due to overhead clearance/infrastructure elevation issues. However, additional soil could be excavated beside the rebuilt tracks to provide drainage ditches, letting the rebuilt track be constructed near the existing grade. The cost of excavating drainage ditches has not been included in this opinion of probable cost.
- Option 6 provides high protectiveness and effectiveness and also the greatest cost.

Track workers are potential receptors who work at the site and are most likely to be exposed to asbestiform fibers. Mitigation of potential track worker exposure should be carefully considered during selection of the final response option.

The options are ranked as follows:

1. Option 5 is ranked first because it provides high protectiveness and long-term effectiveness. This option provides high protection of track workers, as well as other human and environmental receptors.
2. Option 4 is ranked second because it provides acceptable protectiveness and long-term effectiveness. Track workers will be protected provided an adequate ballast thickness is maintained between the bottom of the ties and the underlying soil.
3. Option 6 is ranked third because it does not provide significantly increased protection and effectiveness compared to Option 5, but the cost is significantly higher. It also provides lower short-term protectiveness because substantially more soil must be excavated.
4. Options 1, 2A, 2B, 3A, and 3B provide insufficient effectiveness.

REFERENCES

U.S. Environmental Protection Agency, 1988, Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA – Interim Final, EPA/540/G 89/004.

Tables

TABLE 1

SCREENING OF TECHNOLOGY PROCESS OPTIONS
BNSF Railyard
Libby, Montana

Technology	Process Option	Description	Screening Comments
No Further Action	Not applicable	Does not achieve response action objectives	Required for consideration
Institutional Controls	Deed restrictions, railroad procedural restrictions	Deed restrictions, railroad procedural restrictions	Potentially Applicable
Capping	Cap by Raising Tracks in Place	Raise Tracks in Place by 6 Inches	Not effective because it does not remove ACM from future work zone
		Raise Tracks in Place by 8 Inches	Potentially applicable, cannot place geotextile barrier
		Raise Tracks in Place by 12 Inches	Potentially applicable, cannot place geotextile barrier
	Cap without barrier	Remove Rails and Hardware, Leave Ties, Cap Without Geotextile Barrier	Not applicable; structural integrity of cap is a concern as ties degrade.
	Cap with barrier	Remove Rails and Hardware, Leave Ties, Cap With Geotextile Barrier	Potentially applicable
		Remove Rails and Ties, Place Barrier, Cap	Potentially applicable
Excavation	Excavate and dispose of contamination	Remove Rails and Ties, Excavate, Backfill or Rebuild Track	Potentially applicable

Notes:

ACM: Asbestos-containing material.

TABLE 2

DESCRIPTION OF CONCEPTUAL RESPONSE OPTIONS
BNSF Railyard
Libby, Montana

Option No.	Description and Components
1	**No Further Action** Institutional controls to address risks to human health and the environment.
2	**Raise Four Tracks in Place**
2A	***Raise Four Tracks by 8 Inches, Remove and Cap Track 5 and West Spurs*** Place ballast and raise Tracks 1, 2, 3, and 4 in four 2-inch lifts. Remove Track 5 and industrial spurs located west of Highway overpass. Cap removed tracks and adjacent area with 12 inches of crushed rock from local source. Institutional controls to maintain caps and protect from residual risk of material below caps.
2B	***Raise Four Tracks by 12 Inches, Remove and Cap Track 5 and West Spurs*** Place ballast and raise Tracks 1, 2, 3, and 4 in six 2-inch lifts. Remove Track 5 and industrial spurs located west of Highway overpass. Cap removed tracks and adjacent area with 12 inches of crushed rock from local source. Institutional controls to maintain caps and protect from residual risk of material below caps.
3	**Raise Two Tracks in Place**
3A	***Raise Tracks 3 and 4 by 8 Inches, Remove and Cap Track 1, 2, 5, and West Spurs*** Place ballast and raise Tracks 3 and 4 in four 2-inch lifts. Remove Tracks 1, 2, 5, and industrial spurs located west of Highway overpass. Cap removed tracks and adjacent area with 12 inches of crushed rock from local source. Institutional controls to maintain caps and protect from residual risk of material below caps.
3B	***Raise Tracks 3 and 4 by 12 Inches, Remove and Cap Track 1, 2, 5, and West Spurs*** Place ballast and raise Tracks 3 and 4 in six 2-inch lifts. Remove Tracks 1, 2, 5, and industrial spurs located west of Highway overpass. Cap removed tracks and adjacent area with 12 inches of crushed rock from local source. Institutional controls to maintain caps and protect from residual risk of material below caps.
4	**Remove All Tracks, Place Barrier, Rebuild Tracks 3 and 4, Cap Track 1, 2, 5, and West Spurs** Remove Tracks 3 and 4, including ties, grade surface, place geotextile barrier, and rebuild Tracks 3 and 4. Remove Tracks 1, 2, 5, and industrial spurs located west of Highway overpass. Cap removed tracks and adjacent area with 12 inches of crushed rock from local source. Institutional controls to maintain caps and protect from residual risk of material below caps.
5	**Remove All Tracks, Excavate and Rebuild Tracks 3 and 4, Place Barrier and Cap Track 1, 2, 5, and West Spurs** Remove Tracks 3 and 4, including ties, excavate average of 12 inches and rebuild Tracks 3 and 4. Remove Tracks 1, 2, 5, and industrial spurs located west of Highway overpass. Cap removed tracks and adjacent area with 12 inches of crushed rock from local source. Institutional controls to maintain caps and protect from residual risk of material below caps.
6	**Remove and Excavate Tracks 1, 2, 3, 4, 5, and West Spurs, Rebuild Track 3 and 4, Cap Remainder** Remove Tracks 1, 2, 3, 4, 5, and West Spurs; excavate average of 12 Inches. Rebuild Tracks 3 and 4. Cap removed tracks and adjacent area with 12 inches of crushed rock from local source. No institutional controls needed unless residual contamination remains below practical excavation depth.

TABLE 3

RANKING BY CAPITAL COST
BNSF Railyard
Libby, Montana

Relative Ranking	Conceptual Response Options	Estimated Capital Cost
1 (lowest)	1. No further action	$ 140,000
2	2A. Raise four tracks by 8 inches, remove and cap Track 5 and West Spurs	$ 990,000
3	3A. Raise Tracks 3 and 4 by 8 inches, remove and cap Track 1, 2, 5 and West Spurs	$ 1,000,000
4	3B. Raise Tracks 3 and 4 by 12 inches, remove and cap Track 1, 2, 5 and West Spurs	$ 1,070,000
5	2B. Raise four tracks by 12 inches, remove and cap Track 5 and West Spurs	$ 1,110,000
6	4. Remove all tracks, place barrier, rebuild Tracks 3 and 4, cap Tracks 1, 2, 5, and West Spurs	$ 2,000,000
7	5. Remove all tracks, excavate and rebuild Tracks 3 and 4, place barrier and cap Track 1, 2, 5 and West Spurs	$ 2,490,000
8 (highest)	6. Remove and excavate all tracks, rebuild Tracks 3 and 4, backfill remainder	$ 3,270,000

Notes: Details for Engineer's Estimates of Probable Cost are enclosed in Appendix A.
Engineer's Estimates of Probable Cost are based on information collected within a limited time frame and, therefore, do not necessarily fall within the recommended CERCLA range of +50%/-30%. However, costs have been estimated using consistent values and should reasonably represent the relative costs between conceptual response options.

TABLE 4

COMPARATIVE EVALUATION OF CONCEPTUAL RESPONSE OPTIONS
BNSF Railyard
Libby, Montana

Conceptual Option		Protectiveness (Inhalation)	Compliance with Action Level	Short-Term Effectiveness	Long-Term Effectiveness	Reduction of Toxicity, Mobility and Volume	Implementability	Relative Cost (thousands)
1	No further action	○	○	○	○	○	●	$140
2A	Raise 4 tracks by 8 inches, remove remaining tracks, place barrier and cap	◑ *	●	◕	◔	◔	◕	$990
2B	Raise 4 tracks by 12 inches, remove remaining tracks, place barrier and cap	◕ *	●	◕	◑	◔	◕	$1,110
3A	Raise 2 tracks by 8 inches, remove remaining tracks, place barrier and cap	◑ *	●	◕	◔	◔	◕	$1,000
3B	Raise 2 tracks by 12 inches, remove remaining tracks, place barrier and cap	◕ *	●	◕	◑	◔	◕	$1,070
4	Remove all tracks, place barrier, rebuild 2 tracks, cap remainder	● *	●	◕	◕	◑	◕	$2,000
5	Remove all tracks, excavate footprint of 2 tracks and rebuild them, place barrier and cap remainder	● *	●	◕	●	◕	●	$2,490
6	Remove all tracks, excavate, backfill, and rebuild 2 tracks	●	●	◑	●	●	●	$3,270

Notes:

● Meets or exceeds criteria (high ranking).

◕ Meets criteria with few exceptions (moderate to high ranking).

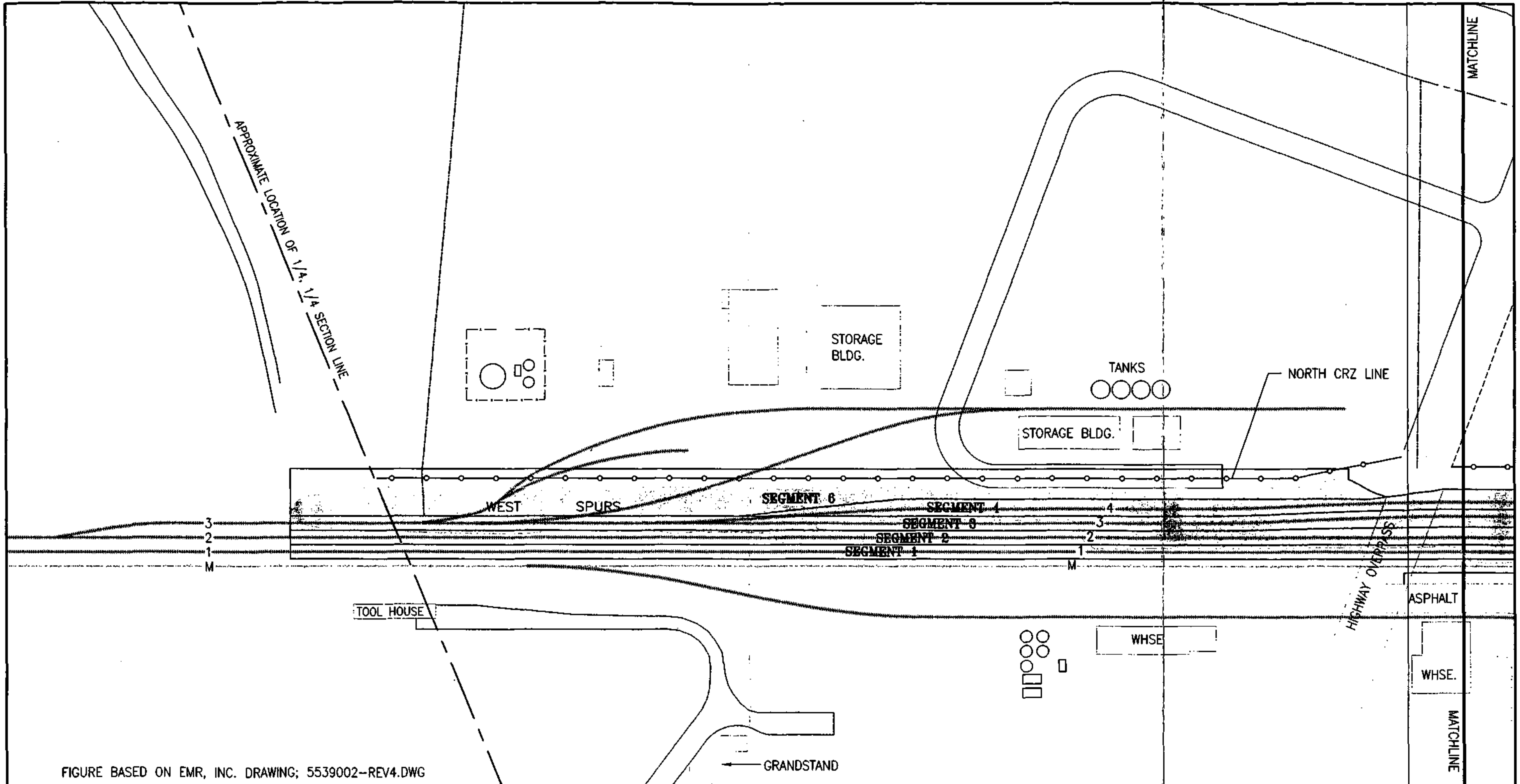
◑ Meets criteria with some exceptions (moderate ranking).

◔ May not meet all criteria (low ranking).

○ Does not meet criteria (low ranking).

* Conceptual option considered protective of human health (dust pathway) with appropriate institutional controls.

Figures



LEGEND

SEGMENT 1	RESPONSE ACTION SEGMENTS
	ZONE OF VISIBLE MICA FLAKES
	FENCE
1	RAILROAD TRACKS WITH ASSIGNED NUMBER
M	MAIN LINE RAILROAD TRACKS (3-4" DIAMETER QUARTZITE BALLAST AT LEAST 1-FOOT DEEP
	CONTAMINANT REDUCTION ZONE (CRZ) FOR ERM WORK IN 2003

0 50 100

APPROXIMATE SCALE IN FEET

N

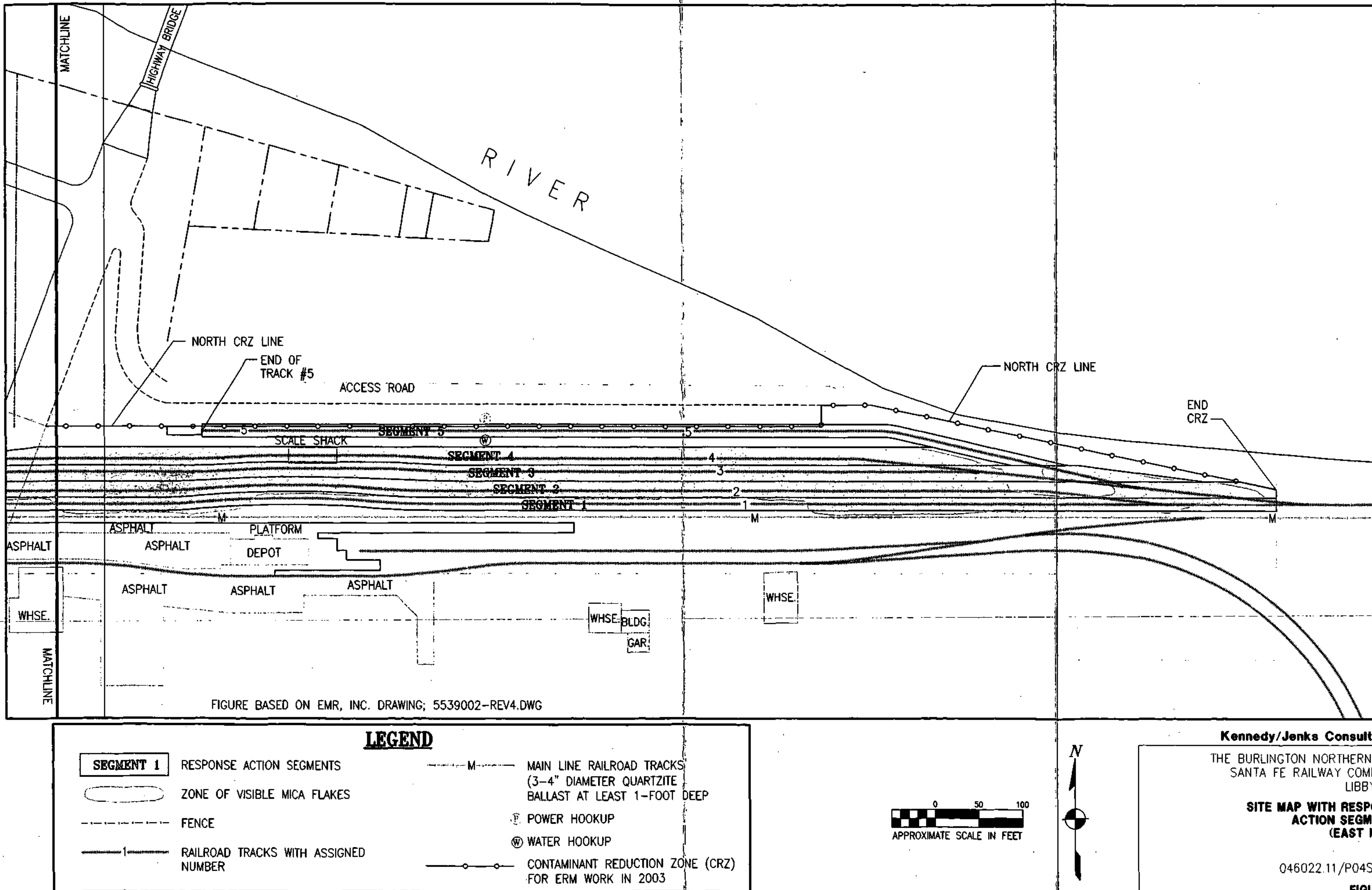
Kennedy/Jenks Consultants

THE BURLINGTON NORTHERN AND SANTA FE RAILWAY COMPANY
LIBBY, MT

SITE MAP WITH RESPONSE ACTION SEGMENTS (WEST HALF)

046022.11/P04SK001

FIGURE 1



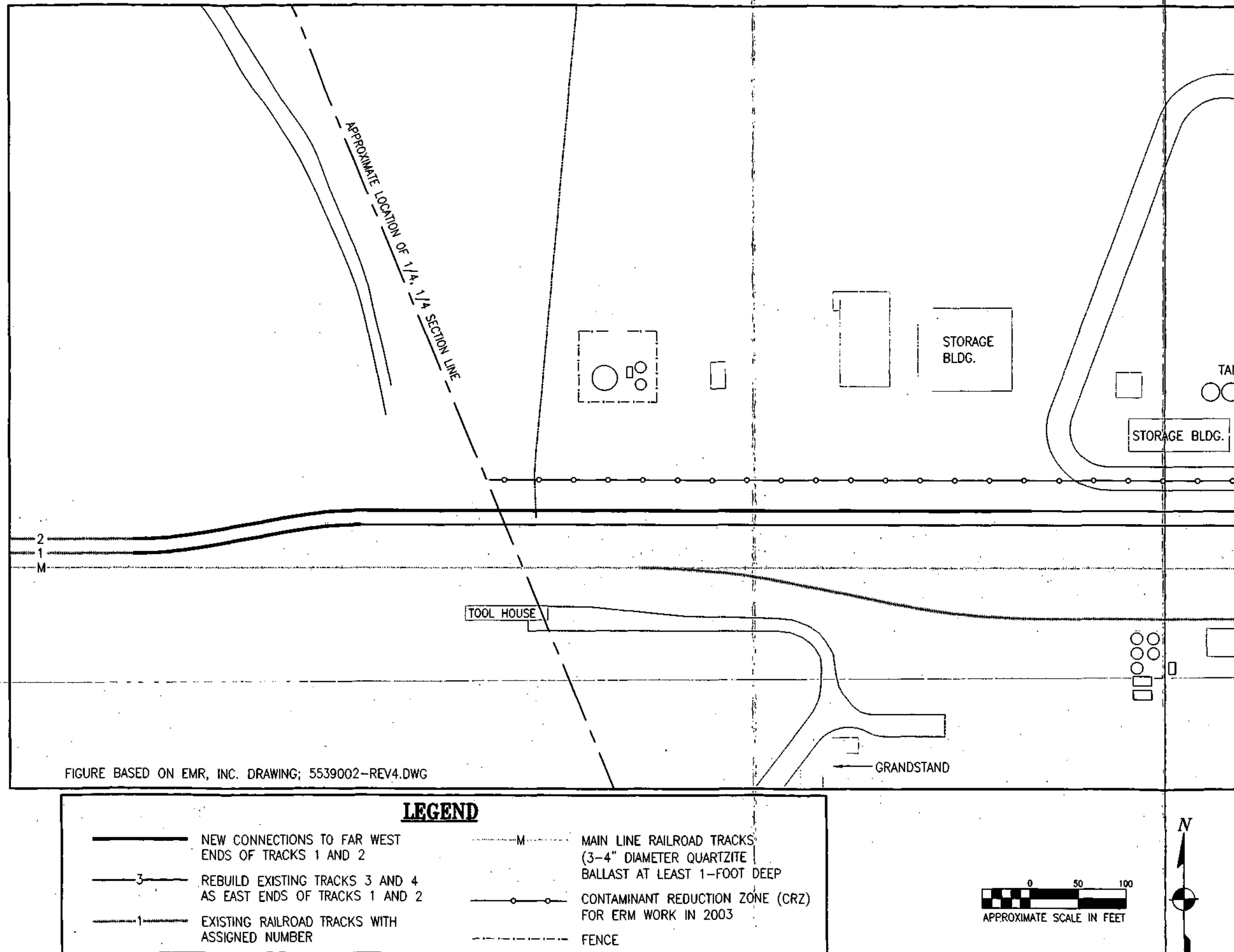
Kennedy/Jenks Consultants

THE BURLINGTON NORTHERN AND SANTA FE RAILWAY COMPANY
LIBBY, MT

SITE MAP WITH RESPONSE ACTION SEGMENTS (EAST HALF)

046022.11/P04SK002

FIGURE 2



Kennedy/Jenks Consultants

THE BURLINGTON NORTHERN AND SANTA FE RAILWAY COMPANY
LIBBY, MT

TRACK ORIENTATION TO REBUILD TRACKS 3 AND 4 AS TRACKS 1 AND 2

046022.11/P04SK003

FIGURE 3

Appendix A

Engineer's Estimate of Probable Cost

ENGINEER'S ESTIMATE OF PROBABLE COST **KENNEDY/JENKS CONSULTANTS**

Project: **BNSF Libby Railyard Evaluation of Conceptual Response Options**

Option Description: **Option 1 - No Further Action (With Institutional Controls)**

Prepared By: CHS
Date Prepared: 29-Apr-04
K/J Proj. No. 46022.11

Current at ENR ________
Escalated to ENR ________

Estimate Type:
[X] Conceptual
[ ] Preliminary (w/o plans)
[ ] Design Development @ ______ % Complete
[ ] Construction
[ ] Change Order

Spec. Section	Item No.	Description	Qty	Units	Materials $/Unit	Materials Total	Labor and Equipment $/Unit	Labor and Equipment Total	Sub-contractor $/Unit	Sub-contractor Total	Total	Source
						0		0		0	0	
	1	Institutional Controls	1	ea	40,000.00	40,000		0		0	40,000	K/J professional judgement
	2	8-ft Chain Link Fence - materials and installation, including 2 gates	5,405	lf	14.80	80,007		0		0	80,007	2002 Bid by Continental Fence of Butte for similar fence, includes 10 percent contingency
	3	Record Survey				0		0	1	20,000	20,000	K/J professional judgement
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
Subtotals						120,007		0		20,000	140,007	

140,000 Rounded

ENGINEER'S ESTIMATE OF PROBABLE COST **KENNEDY/JENKS CONSULTANTS**

Project: BNSF Libby Railyard Evaluation of Conceptual Response Options

Option Description: Option 2A - Raise 4 Tracks by 8 Inches, Remove and Cap Track 5 and West Spurs

Prepared By: CHS/DAS
Date Prepared: 29-Apr-04
K/J Proj. No. 48022.11

Current at ENR ______
Escalated to ENR ______

Estimate Type:
- [X] Conceptual
- [ ] Preliminary (w/o plans)
- [ ] Design Development @ ______ % Complete
- [ ] Construction
- [ ] Change Order

Spec. Section	Item No.	Description	Qty	Units	Materials $/Unit	Materials Total	Labor and Equipment $/Unit	Labor and Equipment Total	Sub-contractor $/Unit	Sub-contractor Total	Total	Source
	1	load and ship ballast	7628	ton	13.39	102,139		0		0	102,139	Prorated Butte 2001 cost + 10 %
	2	Place 2-in lift of ballast	1907	ton	1.28	2,441		0		0	2,441	BNSF $100/car and 78 ton/car
	3	Raise tracks 2-in lift	10480	lin ft	0.38	3,982		0		0	3,982	BNSF $2000/mile for 2 in rise
	4	pressure wash rails	250	ea	5.00	1,250		0		0	1,250	Montana Rail Services
	5	pressure wash ties	5300	ea	2.50	13,250		0		0	13,250	Montana Rail Services
	6	repeat ballast 3 times for 8-in total	5721	ton	1.28	7,323		0		0	7,323	See item 2
	7	Raise tracks 3 times	10480	lin ft	1.14	11,947		0		0	11,947	BNSF
	8	Replace 50 percent of ties	2900	ea	40.00	116,000		0		0	116,000	$40/tie including labor
	9	track modification days	25			0		0		0	0	
	10	Decommission scale pit	1	ea	25,000.00	25,000		0		0	25,000	K/J professional judgement
	11	Remove and cap track 5		link		0		0	Link 5	20,305	20,305	Link (Rmv Trk 5 Cap)
	12	Remove west spurs		link		0		0	Link 3	12,515	12,515	Link (Rmv West Spurs)
	13	West Spur Area	45800	sq ft		0		0		0	0	EMR and K/J
	14	Grade West Spur site	45800	sq ft	0.07	3,053		0		0	3,053	Cost RS Means
	15	place geotextile	45800	sq ft	0.20	9,160		0		0	9,160	Wilder 2001 bid for Butte labor & materials
	16	cap with 12 inches of local rock	2,993	ton	6.64	19,877		0		0	19,877	Crushed rock road subbase from Libby supplier
	17	compaction of 12" cap, 6" lifts	1,996	L.C.Y.	0.30	599		0		0	599	Cost RS Means, assumed 85% compaction
	18	grade 6" lifts, 2 passes	91,600	sq ft	0.07	6,107		0		0	6,107	Cost RS Means
	19	hauling/grading/capping days	6			0		0		0	0	K/J - from RS Means
	20					0		0		0	0	
	21	dust control - water truck with operator	8	week	4,200.00	33,600		0		0	33,600	RS Means
	22					0		0		0	0	
	23	mobilization/demobilization of equipment	1	ea	4,140.00	4,140		0		0	4,140	$230/ea, 4 dump trucks, 1 loader, 1 roller, 2 dozers, 1 grader
	24	mobilization/demobilization days	1			0		0		0	0	K/J
	25					0		0		0	0	
	26	Institutional controls and fence	1	ea	140,000.00	140,000		0		0	140,000	K/J professional judgement
	27					0		0		0	0	
	28	Level C PPE - 6 man crew, six weeks	1	ea	5,112.00	5,112		0		0	5,112	One replacement filter/worker , Six replacement Tyvek suits/worker
	29	Air Monitoring Labor/Work Zone	32	day		0	700.00	22,400		0	22,400	EMR ($70 x 10 hours/day)
	30	Air Monitoring Lab/Work Zone	32	day	570.00	18,240		0		0	18,240	EMR
Subtotals						523,220		22,400		32,820	578,440	

Construction Contingency	35%	202,454
Montana Gross Recipts Tax	1%	7,809
Total Construction Cost Opinion		788,702
Design Engineering	12.5%	98,588
Construction Management	12.5%	98,588
Total Enginer's Cost Opinion		985,878
		990,000 **ROUNDED**

ENGINEER'S ESTIMATE OF PROBABLE COST | **KENNEDY/JENKS CONSULTANTS**

Project: BNSF Libby Railyard Evaluation of Conceptual Response Options

Option Description: Option 2B - Raise 4 Tracks by 12 inches, Remove and Cap Track 5 and West Spurs

Prepared By: CHS/DAS
Date Prepared: 29-Apr-04
K/J Proj. No. 48022.11

Current at ENR ________
Escalated to ENR ________

Estimate Type:
- [X] Conceptual
- [ ] Preliminary (w/o plans)
- [ ] Design Development @ ______ % Complete
- [ ] Construction
- [ ] Change Order

Spec. Section	Item No.	Description	Qty	Units	Materials $/Unit	Materials Total	Labor and Equipment $/Unit	Labor and Equipment Total	Sub-contractor $/Unit	Sub-contractor Total	Total	Source
	1	load and ship ballast	11,442	ton	13.39	153,208		0		0	153,208	Prorated Butte 2001 cost + 10 %
	2	Place 2-in lift of ballast	1,907	ton	1.28	2,441		0		0	2,441	BNSF $100/car and 78 ton/car
	3	Raise tracks 2-in lift	10,665	lin ft	0.38	4,053		0		0	4,053	BNSF $2000/mile for 2 in rise
	4	pressure wash rails	250	ea	5.00	1,250		0		0	1,250	Montana Rail Services
	5	pressure wash ties	5,300	ea	2.50	13,250		0		0	13,250	Montana Rail Services
	6	repeat ballast 5 times for 12-in	9,535	ton	1.28	12,205		0		0	12,205	see item 2
	7	Raise tracks 5 times	10,665	lin ft	1.90	20,264		0		0	20,264	BNSF
	8	Replace 50 percent of ties	2900	ea	40.00	116,000		0		0	116,000	$40/tie including labor
	9	track modification days	29			0		0		0	0	
	10	Decommission scale pit	1	ea	25,000.00	25,000		0		0	25,000	K/J professional judgement
	11	Remove and cap track 5	1	link		0		0	Link 5	20,305	20,305	Link (Track 5 Cap)
	12	Remove west spurs	1	link		0		0	Link 3	12,515	12,515	Link (Rmv West Spurs)
	13	West Spur Area	45,800	sq ft		0		0		0	0	EMR and K/J
	14	grade West Spur site	45,800	sq ft	0.07	3,053		0		0	3,053	Cost RS Means
	15	place geotextile	45,800	sq ft	0.20	9,160		0		0	9,160	Wilder 2001 bid for Butte labor & materials
	16	cap with 12 inches of local rock	2,993	ton	6.64	19,877		0		0	19,877	Crushed rock road subbase from Libby supplier
	17	compaction of 12" cap, 6" lifts	1,996	L.C.Y.	0.30	599		0		0	599	Cost RS Means, assumed 85% compaction
	18	grade 6" lifts, 2 passes	91,600	sq ft	0.07	6,107		0		0	6,107	Cost RS Means
	19	hauling/grading/capping days	6			0		0		0	0	K/J - from RS Means
	20					0		0		0	0	
	21	dust control - water truck with operator	9	week	4,200.00	37,800		0		0	37,800	RS Means
	22					0		0		0	0	
	23	mobilization/demobilization of equipment	1	ea	4,140.00	4,140		0		0	4,140	$230/ea, 4 dump trucks, 1 loader, 1 roller, 2 dozers, 1 grader
	24	mobilization/demobilization days	1			0		0		0	0	K/J
	25					0		0		0	0	
	26	Institutional controls and fence	1	ea	140,000.00	140,000		0		0	140,000	K/J professional judgement
	27					0		0		0	0	
	28	Level C PPE - 6 man crew - 7 weeks	1	ea	5,184.00	5,184		0		0	5,184	One replacement filter/worker , Seven replacement Tyvek suits/worker
	29	Air Monitoring Labor/Work Zone	36	day		0	700.00	25,200		0	25,200	EMR ($70 x 10 hours/day)
	30	Air Monitoring Lab/Work Zone	36	day	570.00	20,520		0		0	20,520	EMR
Subtotals						594,110		25,200		32,820	652,129	

Construction Contingency	35%	228,245
Montana Gross Recipts Tax	1%	8,804
Total Construction Cost Opinion		**889,179**
Design Engineering	12.5%	111,147
Construction Management	12.5%	111,147
Total Enginer's Cost Opinion		**1,111,473**
		1,110,000 ROUNDED

ENGINEER'S ESTIMATE OF PROBABLE COST **KENNEDY/JENKS CONSULTANTS**

Project: BNSF Libby Railyard Evaluation of Conceptual Response Options

Option Description: Option 3A - Raise Tracks 1 & 2 by 8 Inches, Remove Tracks 3, 4, 5, West Spurs

Prepared By: CHS/DAS
Date Prepared: 29-Apr-04
K/J Proj. No. 46022.11

Current at ENR ______
Escalated to ENR ______

Estimate Type:
- [X] Conceptual
- [ ] Preliminary (w/o plans)
- [ ] Design Development @ ______ % Complete
- [ ] Construction
- [ ] Change Order

Spec. Section	Item No.	Description	Qty	Units	Materials $/Unit	Materials Total	Labor and Equipment $/Unit	Labor and Equipment Total	Sub-contractor $/Unit	Sub-contractor Total	Total	Source
	1	load and ship ballast	4,148	ton	13.39	55,542		0		0	55,542	Prorated Butte 2001 cost + 10 %
	2	Place 2-in lift of ballast	1,037	ton	1.28	1,327		0		0	1,327	BNSF $100/car and 78 ton/car
	3	Raise tracks 2-in lift	5,700	lin ft	0.38	2,166		0		0	2,166	BNSF $2000/mile for 2 in rise
	4	pressure wash rails	150	ea	5.00	750		0		0	750	Montana Rail Services
	5	pressure wash ties	3,300	ea	2.50	8,250		0		0	8,250	Montana Rail Services
	6	repeat ballast 3 times for 8-in total	3,111	ton	1.28	3,982		0		0	3,982	See item 2
	7	Raise tracks 3 times	5,700	lin ft	1.14	6,498		0		0	6,498	BNSF
	8	Replace 50 percent of ties	1,650	ea	40.00	66,000		0		0	66,000	$40/tie including labor
	9	track modification days	15			0		0		0	0	
	10	Decommission scale pit	1	ea	25,000.00	25,000		0		0	25,000	K/J professional judgement
	11	Remove and cap track 5		link		0		0	Link 5	20,305	20,305	Link (Track 5 Cap)
	12	Remove Tracks 3 and 4		link		0		0	Link 2	38,970	38,970	Link (Rmv Trk 3&4)
	13	Remove west spurs		link		0		0	Link 3	12,515	12,515	Link (Rmv West Spurs)
	14	West Spur Area	45,800	sq ft		0		0		0	0	EMR and K/J
	15	Track 3&4 Area	75,800	sq ft		0		0		0	0	
	16	Grade Trk 1, 2, West Spur sites	121,600	sq ft	0.07	8,107		0		0	8,107	Cost RS Means
	17	place geotextile	121,600	sq ft	0.20	24,320		0		0	24,320	Wilder 2001 bid for Butte labor & materials
	18	cap with 12 inches of local rock	7,948	ton	6.64	52,773		0		0	52,773	Crushed rock road subbase from Libby supplier
	19	compaction of 12" cap, 6" lifts	5,298	L.C.Y.	0.30	1,590		0		0	1,590	Cost RS Means, assumed 85% compaction
	20	grade 6" lifts, 2 passes	243,200	sq ft	0.07	16,213		0		0	16,213	Cost RS Means
	21	hauling/grading/capping days	16			0		0		0	0	K/J - from RS Means
	22					0		0		0	0	
	23	dust control - water truck with operator	12	week	4,200.00	50,400		0		0	50,400	RS Means
	24					0		0		0	0	
	25	mobilization/demobilization of equipment	1	ea	4,140.00	4,140		0		0	4,140	$230/ea, 4 dump trucks, 1 loader, 1 roller, 2 dozers, 1 grader
	26	mobilization/demobilization days	1			0		0		0	0	K/J
	27					0		0		0	0	
	28	Institutional controls and fence	1	ea	140,000.00	140,000		0		0	140,000	K/J professional judgement
	29					0		0		0	0	
	30	Level C PPE - 6 man crew - six weeks	1	ea	5,112.00	5,112		0		0	5,112	One replacement filter/worker, Six replacement Tyvek suits/worker
	31	Air Monitoring Labor/Work Zone	32	day		0	700.00	22,400		0	22,400	EMR ($70 x 10 hours/day)
	32	Air Monitoring Lab/Work Zone	32	day	570.00	18,240		0		0	18,240	EMR
Subtotals						433,540		22,400		71,790	584,599	

Construction Contingency	35%	204,610
Montana Gross Recipts Tax	1%	7,892
Total Construction Cost Opinion		797,101
Design Engineering	12.5%	99,638
Construction Management	12.5%	99,638
Total Engineer's Cost Opinion		996,377
		1,000,000 **ROUNDED**

ENGINEER'S ESTIMATE OF PROBABLE COST | **KENNEDY/JENKS CONSULTANTS**

Project: BNSF Libby Railyard Evaluation of Conceptual Response Options

Option Description: Option 3B - Raise Tracks 1 & 2 by 12 inches, Remove Tracks 3, 4, 5, West Spurs

Prepared By: CHS/DAS
Date Prepared: 29-Apr-04
K/J Proj. No. 46022.11

Current at ENR ______
Escalated to ENR ______

Estimate Type:
- [X] Conceptual
- [ ] Preliminary (w/o plans)
- [ ] Design Development @ ______ % Complete
- [ ] Construction
- [ ] Change Order

Spec. Section	Item No.	Description	Qty	Units	Materials $/Unit	Materials Total	Labor and $/Unit	Labor Total	Sub-contractor $/Unit	Sub-contractor Total	Total	Source
	1	load and ship ballast	6,222	ton	13.39	83,313		0		0	83,313	Prorated Butte 2001 cost + 10 %
	2	Place 2-in lift of ballast	1,037	ton	1.28	1,327		0		0	1,327	BNSF $100/car and 78 ton/car
	3	Raise tracks 2-in lift	5,885	lin ft	0.38	2,236		0		0	2,236	BNSF $2000/mile for 2 in rise
	4	pressure wash rails	150	ea	5.00	750		0		0	750	Montana Rail Services
	5	pressure wash ties	3,300	ea	2.50	8,250		0		0	8,250	Montana Rail Services
	6	repeat ballast 5 times for 12-in total	5,185	ton	1.28	6,637		0		0	6,637	See item 2
	7	Raise tracks 5 times	5,885	lin ft	1.90	11,182		0		0	11,182	BNSF
	8	Replace 50 percent of ties	1,650	ea	40.00	66,000		0		0	66,000	$40/tie including labor
	9	track modification days	20			0		0		0	0	
	10	Decommission scale pit	1	ea	25,000.00	25,000		0		0	25,000	K/J professional judgement
	11	Remove and cap track 5	1	link		0		0	Link 5	20,305	20,305	Link (Track 5 Cap)
	12	Remove Tracks 3 and 4	1	link		0		0	Link 2	38,970	38,970	Link (Rmv Trks 3&4)
	13	Remove west spurs	1	link		0		0	Link 3	12,515	12,515	Link (Rmv West Spurs)
	14	West Spur Area	45,800	sq ft		0		0		0	0	EMR and K/J
	15	Trk 3&4 Area	75,800	sq ft		0		0		0	0	EMR and K/J
	16	Grade Trk 1, 2, West Spur sites	121,600	sq ft	0.07	8,107		0		0	8,107	Cost RS Means
	17	place geotextile	121,600	sq ft	0.20	24,320		0		0	24,320	Wilder 2001 bid for Butte labor & materials
	18	cap with 12 inches of local rock	7,948	ton	6.64	52,773		0		0	52,773	Crushed rock road subbase from Libby supplier
	19	compaction of 12" cap, 6" lifts	5,298	L.C.Y.	0.30	1,590		0		0	1,590	Cost RS Means, assumed 85% compaction
	20	grade 6" lifts, 2 passes	243,200	sq ft	0.07	16,213		0		0	16,213	Cost RS Means
	21	hauling/grading/capping days	16			0		0		0	0	K/J - from RS Means
	22					0		0		0	0	
	23	dust control - water truck with operator	13	week	4,200.00	54,600		0		0	54,600	RS Means
	24					0		0		0	0	
	25	mobilization/demobilization of equipment	1	ea	4,140.00	4,140		0		0	4,140	$230/ea, 4 dump trucks, 1 loader, 1 roller, 2 dozers, 1 grader
	26	mobilization/demobilization days	1			0		0		0	0	K/J
	27					0		0		0	0	
	28	Institutional controls and fence	1	ea	140,000.00	140,000		0		0	140,000	K/J professional judgement
	29					0		0		0	0	
	30	Level C PPE - 6 man crew - 8 weeks	1	ea	5,256.00	5,256		0		0	5,256	One replacement filter/worker , Eight replacement Tyvek suits/worker
	31	Air Monitoring Labor/Work Zone	37	day		0	700.00	25,900		0	25,900	EMR ($70 x 10 hours/day)
	32	Air Monitoring Lab/Work Zone	37	day	570.00	21,090		0		0	21,090	EMR
Subtotals						532,783		25,900		71,790	630,473	

Construction Contingency	35%	220,665
Montana Gross Recipts Tax	1%	8,511
Total Construction Cost Opinion		**859,650**
Design Engineering	12.5%	107,456
Construction Management	12.5%	107,456
Total Enginer's Cost Opinion		**1,074,562**
		1,070,000 ROUNDED

ENGINEER'S ESTIMATE OF PROBABLE COST **KENNEDY/JENKS CONSULTANTS**

Project: BNSF Libby Railyard Evaluation of Conceptual Response Options

Option Description: Option 4 - Remove, Place Barrier & Rebuild Tracks 3 & 4, Remove & Cap Tracks 1, 2, 5 and West Spurs

Prepared By: CHS/DAS
Date Prepared: 29-Apr-04
K/J Proj. No. 46022.11

Current at ENR ______
Escalated to ENR ______

Estimate Type:
- [X] Conceptual
- [ ] Preliminary (w/o plans)
- [ ] Design Development @ ______ % Complete
- [ ] Construction
- [ ] Change Order

Spec. Section	Item No.	Description	Qty	Units	Materials $/Unit	Materials Total	Labor and Equipment $/Unit	Labor and Equipment Total	Sub-contractor $/Unit	Sub-contractor Total	Total	Source
	1	Remove Tracks 3 and 4	1	link		0		0	Link 2	46,070	46,070	Link (Rmv Trk 3&4)
	2	grade surface	75,719	sq ft	0.07	5,048		0		0	5,048	EMR and K/J
	3	place geotextile	75,719	sq ft	0.20	15,144		0		0	15,144	Wilder 2001 bid for Butte labor & materials
	4	load and ship ballast	4,082	ton	13.39	54,663		0		0	54,663	Prorated Butte 2001 cost + 10 %
	5	Reconstruct tracks 3&4 w/ 8" bal.	5,600	lin ft	100.00	560,000		0		0	560,000	BNSF incl rails ties hdwe ballast
	6	Construct new switches	1	ea	40,000.00	40,000		0		0	40,000	BNSF
	7	track modification days	17			0		0		0	0	K/J and BNSF
	8	earthwork days	3			0		0		0	0	RS Means
	9	Decommission scale pit	1	ea	25,000.00	25,000		0		0	25,000	K/J professional judgement
	10	Remove and cap track 5	1	link		0		0	Link 5	20,305	20,305	Link (Track 5 Cap)
	11	Remove Tracks 1 and 2	1	link		0		0	Link 1	22,446	22,446	Link (Rmv Trk 1&2)
	12	Remove west spurs	1	link		0		0	Link 3	12,515	12,515	Link (Rmv West Spurs)
	13					0		0		0	0	
	14	West Spur Area	45,800	sq ft		0		0		0	0	EMR and K/J
	15	Trk 1&2 Area	85,200	sq ft		0		0		0	0	EMR and K/J
	16	Grade Trk 1, 2, West Spur sites	131,000	sq ft	0.07	8,733		0		0	8,733	Cost RS Means
	17	place geotextile	131,000	sq ft	0.20	26,200		0		0	26,200	Wilder 2001 bid for Butte labor & materials
	18	cap with 12 inches of local rock	8,562	ton	6.64	56,852		0		0	56,852	Crushed rock road subbase from Libby supplier
	19	compaction of 12" cap, 6" lifts	5,708	L.C.Y.	0.30	1,712		0		0	1,712	Cost RS Means, assumed 85% compaction
	20	grade 6" lifts, 2 passes	262,000	sq ft	0.07	17,467		0		0	17,467	Cost RS Means
	21	hauling/grading/capping days	16			0		0		0	0	K/J - from RS Means
	22					0		0		0	0	
	23	dust control - water truck with operator	16	week	4,200.00	67,200		0		0	67,200	RS Means
	24					0		0		0	0	
	25	mobilization/demobilization of equipment	1	ea	4,140.00	4,140		0		0	4,140	$230/ea, 4 dump trucks, 1 loader, 1 roller, 2 dozers, 1 grader
	26	mobilization/demobilization days	1			0		0		0	0	K/J
	27					0		0		0	0	
	28	Institutional controls and fence	1	ea	140,000.00	140,000		0		0	140,000	K/J professional judgement
	29					0		0		0	0	
	30	Level C PPE - 6 man crew - 8 weeks	1	ea	5,256.00	5,256		0		0	5,256	One replacement filter/worker, Eight replacement Tyvek suits/worker
	31	Air Monitoring Labor/Work Zone	37	day		0	700.00	25,900		0	25,900	EMR ($70 x 10 hours/day)
	32	Air Monitoring Lab/Work Zone	37	day	570.00	21,090		0		0	21,090	EMR
Subtotals						1,048,506		25,900		101,336	1,175,742	

Construction Contingency	35%	411,510
Montana Gross Recipts Tax	1%	15,873
Total Construction Cost Opinion		1,603,124
Design Engineering	12.5%	200,390
Construction Management	12.5%	200,390
Total Enginer's Cost Opinion		2,003,905
		2,000,000 **ROUNDED**

ENGINEER'S ESTIMATE OF PROBABLE COST — **KENNEDY/JENKS CONSULTANTS**

Project: BNSF Libby Railyard Evaluation of Conceptual Response Options

Option Description: Option 5 - Remove, Excavate & Rebuild Tracks 3 & 4, Remove & Cap Tracks 1, 2, 5 and West Spurs

Prepared By: CHS/DAS
Date Prepared: 29-Apr-04
K/J Proj. No. 46022.11

Current at ENR ________
Escalated to ENR ________

Estimate Type: [X] Conceptual [ ] Preliminary (w/o plans) [ ] Design Development @ ____ % Complete [ ] Construction [ ] Change Order

Spec. Section	Item No.	Description	Qty	Units	Materials $/Unit	Materials Total	Labor and Equipment $/Unit	Labor and Equipment Total	Sub-contractor $/Unit	Sub-contractor Total	Total	Source
	1	Remove Tracks 3 and 4	1	link		0		0		46,070	46,070	Link (Rmv Trk 3&4)
		Excavate/Load 12 in by 75,800 sq ft	2,850	B.C.Y.	7.15	20,378		0		0	20,378	EMR and K/J, Cost from RS Means
	3	Haul to landfill	3,420	L.C.Y.	22.36	76,471		0		0	76,471	RS Means, 120% Soil Expansion, 10 CY dump truck, 20 mile round trip, heavy traffic
	4	tip fee	4,788	ton	32.00	153,216		0		0	153,216	EMR
	5	load and ship ballast	8,642	ton	13.39	115,722		0		0	115,722	Prorated Butte 2001 cost + 10 %
	6					0		0		0	0	
	7					0		0		0	0	
	8	fill tracks 3&4 with 12 in. ballast	4,560	ton	1.28	5,837		0		0	5,837	K/J vol and BNSF constr. cost.
	9	Reconstruct tracks 3&4 w/ 8" bal.	5,600	lin ft	100.00	560,000		0		0	560,000	BNSF
	10	Construct new switches	1	ea	40,000.00	40,000		0		0	40,000	BNSF incl rails ties hdwe ballast
	11	track modification days	17			0		0		0	0	K/J and BNSF
	12	earthwork days	11			0		0		0	0	RS Means
	13	Decommission scale pit	1	ea	25,000.00	25,000		0		0	25,000	K/J professional judgement
	14	Remove and cap track 5	1	link		0		0		0	20,305	Link (Track 5 Cap)
	15	Remove Tracks 1 and 2	1	link		0		0		0	22,446	Link (Rmv Trk 1&2)
	16	Remove west spurs	1	link		0		0		0	12,515	Link (Rmv West Spurs)
	17	West Spur Area	45,800	sq ft		0		0		0	0	EMR and K/J
	18	Trk 1&2 Area	85,200	sq ft		0		0		0	0	EMR and K/J
	19	Grade Trk 1, 2, West Spur sites	131,000	sq ft	0.07	8,733		0		0	8,733	RS Means
	20	place geotextile	131,000	sq ft	0.20	26,200		0		0	26,200	Wilder 2001 bid for Butte labor & materials
	21	cap with 12 inches of local rock	8,562	ton	6.64	56,852		0		0	56,852	Crushed rock road subbase from Libby supplier
	22	compaction of 12" cap, 6" lifts	5,708	L.C.Y.	0.30	1,712		0		0	1,712	Cost RS Means, assumed 85% compaction
	23	grade 6" lifts, 2 passes	262,000	sq ft	0.07	17,467		0		0	17,467	Cost RS Means
	24	hauling/grading/capping days	16			0		0		0	0	K/J - from RS Means
	25	dust control - water truck with operator	12	week	4,200.00	50,400		0		0	50,400	RS Means
	26					0		0		0	0	
	27	mobilization/demobilization of equipment	1	ea	4,140.00	4,140		0		0	4,140	$230/ea, 4 dump trucks, 1 loader, 1 roller, 2 dozers, 1 grader
	28	mobilization/demobilization days	1			0		0		0	0	K/J
	29					0		0		0	0	
	30	Institutional controls and fence	1	ea	140,000.00	140,000		0		0	140,000	K/J professional judgement
	31					0		0		0	0	
	32	Level C PPE - 6 man crew - 9 weeks	1	ea	5,568.00	5,568		0		0	5,568	Two replacement filter/worker, Nine replacement Tyvek suits/worker
	33	Air Monitoring Labor/Work Zone	45	day		0	700.00	31,500		0	31,500	EMR ($70 x 10 hours/day)
	34	Air Monitoring Lab/Work Zone	45	day	500.00	22,500		0		0	22,500	EMR
Subtotals						1,330,196		31,500		46,070	1,463,032	

Construction Contingency	35%	512,061
Montana Gross Recipts Tax	1%	19,751
Total Construction Cost Opinion		1,994,844
Design Engineering	12.5%	249,355
Construction Management	12.5%	249,355
Total Engineer's Cost Opinion		2,493,555
		2,490,000 ROUNDED

ENGINEER'S ESTIMATE OF PROBABLE COST **KENNEDY/JENKS CONSULTANTS**

Project: BNSF Libby Railyard Evaluation of Conceptual Response Options

Option Description: Option 6 - Remove, Excavate, Cap Tracks 1, 2, 3, 4, 5 and West Spurs, Rebuild Tracks 3 & 4

Prepared By: CHS/DAS
Date Prepared: 29-Apr-04
K/J Proj. No. 46022.11

Current at ENR ________
Escalated to ENR ________

Estimate Type:
- [X] Conceptual
- [ ] Preliminary (w/o plans)
- [ ] Design Development @ ________ % Complete
- [ ] Construction
- [ ] Change Order

Spec. Section	Item No.	Description	Qty	Units	Materials $/Unit	Materials Total	Labor and $/Unit	Labor Total	Sub-contractor $/Unit	Sub-contractor Total	Total	Source
	1	Remove Tracks 3 and 4	1	link		0		0	Link 2	46,070	46,070	Link (Rmv Trk 3&4)
	2	Remove and cap track 5	1	link		0		0	Link 4	8,649	8,649	Link (Rmv Trk 5)
	3	Remove Tracks 1 and 2	1	link		0		0	Link 1	39,103	39,103	Link (Rmv Trk 1&2) incl ties
	4	Remove west spurs	1	link		0		0	Link 3	13,214	13,214	Link (Rmv West Spurs)
	5	Decommission scale pit	1	ea	25,000.00	25,000		0		0	25,000	K/J professional judgement
	6	Area tracks 3 & 4	75,800			0		0		0	0	K/J Figures 1 and 2
	7	Area tracks 1 & 2	85,200			0		0		0	0	K/J Figures 1 and 3
	8	Area West Spurs	45,800			0		0		0	0	K/J Figures 1 and 4
	9	Areas to be excavated	206,800			0		0		0	0	K/J Figures 1 and 5
	10	Excavate/Load 12 inches x Area (item 9)	7,659	B.C.Y.	7.15	54,764		0		0	54,764	EMR and K/J, Cost from RS Means
	11	Haul to landfill	9,191	L.C.Y.	22.36	205,513		0		0	205,513	RS Means, 120% Soil Expansion, 10 CY dump truck, 20 mile round trip, heavy traffic
	12	tip fee	12,868	ton	32.00	411,762		0		0	411,762	BNSF
	13	load and ship ballast	8,642	ton	13.39	115,722		0		0	115,722	Prorated Butte 2001 cost + 10 %
	14	fill tracks 3&4 with 12 in. ballast	4,560	ton	1.28	5,837		0		0	5,837	K/J vol and BNSF constr. cost.
	15	Construct new tracks 3 & 4	5,600	lin ft	100.00	560,000		0		0	560,000	BNSF
	16	Construct new switches	1	ea	40,000.00	40,000		0		0	40,000	BNSF incl rails ties hdwe ballast
	17	track modification days	17			0		0		0	0	K/J and BNSF
	18	earthwork days	24			0		0		0	0	RS Means
	19					0		0		0	0	
	20	West Spur Area	45,800	sq ft		0		0		0	0	EMR and K/J
	21	Trk 1&2 Area	85,200	sq ft		0		0		0	0	EMR and K/J
	22	Grade Trk 1, 2, West Spur sites	131,000	sq ft	0.07	8,733		0		0	8,733	Cost RS Means
	23	no geotextile needed	0	sq ft	0.20	0		0		0	0	Wilder 2001 bid for Butte labor & materials
	24	cap with 12 inches of local rock - includes delivery and spread	8,562	ton	6.64	56,852		0		0	56,852	Crushed rock road subbase from Libby supplier
	25	compaction of 12" cap, 6" lifts	5,708	L.C.Y.	0.30	1,712		0		0	1,712	Cost RS Means, assumed 85% compaction
	26	grade 6" lifts, 2 passes	262,000	sq ft	0.07	17,467		0		0	17,467	Cost RS Means
	27	hauling/grading/capping days	16			0		0		0	0	K/J - from RS Means
	28					0		0		0	0	
	29	dust control - water truck with operator	20	week	4,200.00	84,000		0		0	84,000	RS Means
	30					0		0		0	0	
	31	mobilization/demobilization of equipment	1	ea	4,140.00	4,140		0		0	4,140	$230/ea, 4 dump trucks, 1 loader, 1 roller, 2 dozers, 1 grader
	32	mobilization/demobilization days	1			0		0		0	0	K/J
	33	Institutional controls and fence	1	ea	140,000.00	140,000		0		0	140,000	May need ICs for residual subsurface asbestos; fence desirable
	34	Level C PPE - 6 man crew - 12 weeks	1	ea	6,024.00	6,024		0		0	6,024	Three replacement filter/worker, Twelve replacement Tyvek suits/worker
	35	Air Monitoring Labor/Work Zone	58	day		0	700.00	40,600		0	40,600	EMR ($70 x 10 hours/day)
	36	Air Monitoring Lab/Work Zone	58	day	570.00	33,060		0		0	33,060	EMR
Subtotals						1,770,586		40,600		107,035	1,918,221	

Construction Contingency	35%	671,377
Montana Gross Recipts Tax	1%	25,896
Total Construction Cost Opinion		2,615,494
Design Engineering	12.5%	326,937
Construction Management	12.5%	326,937
Total Engineer's Cost Opinion		3,269,368
		3,270,000 ROUNDED

ENGINEER'S ESTIMATE OF PROBABLE COST **KENNEDY/JENKS CONSULTANTS**

Project: BNSF Libby Railyard Evaluation of Conceptual Response Options

Option Description: Link 1 - Linked Cost to Remove Tracks 1 and 2

Prepared By: CHS
Date Prepared: 9-Mar-04
K/J Proj. No. 46022.11

Current at ENR ________
Escalated to ENR ________

Estimate Type: [X] Conceptual [ ] Construction
[ ] Preliminary (w/o plans) [ ] Change Order
[ ] Design Development @ ______ % Complete

Spec. Section	Item No.	Description	Qty	Units	Materials $/Unit	Materials Total	Labor and $/Unit	Labor Total	Sub-contractor $/Unit	Sub-contractor Total	Total	Source
						0		0		0	0	
		Remove rails	5,010	ft	1.25	6,263		0		0	6,263	Montana Rail Services
		tear out turnouts and stockpile	2	ea	750.00	1,500		0		0	1,500	Montana Rail Services
		remove ties and stockpile	2,800	ea	0.75	2,100		0		0	2,100	Montana Rail Services
		Power wash ties	2,800	ea	2.50	7,000		0		0	7,000	Montana Rail Services
		Power wash rails	130	ea	5.00	650		0		0	650	Montana Rail Services
		rail removal days w/decon	17			0		0		0	0	K/J est
		rail removal days w/decon rails	11			0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
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						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
		Air Monitoring Labor/Work Zone	17	day		0	700.00	11,900		0	11,900	EMR ($70 x 10 hours/day)
		Air Monitoring Lab/Work Zone	17	day	570.00	9,690		0		0	9,690	EMR
Subtotals						27,203		11,900		0	39,103	

Remove rails and ties, decon rails and ties 39,103 Option 6

Remove and decon rails, leave ties 22,446 Options 4, 5

ENGINEER'S ESTIMATE OF PROBABLE COST **KENNEDY/JENKS CONSULTANTS**

Project: BNSF Libby Railyard Evaluation of Conceptual Response Options

Option Description: Link 2 - Linked Cost to Remove Tracks 3 and 4

Prepared By: CHS
Date Prepared: 9-Mar-04
K/J Proj. No. 46022.11

Current at ENR ______
Escalated to ENR ______

Estimate Type:
[X] Conceptual
[ ] Preliminary (w/o plans)
[ ] Design Development @ ______ % Complete
[ ] Construction
[ ] Change Order

Spec. Section	Item No.	Description	Qty	Units	Materials $/Unit	Materials Total	Labor and $/Unit	Total	Sub-contractor $/Unit	Sub-contractor Total	Total	Source
		Remove rails	4,600	ft	1.25	5,750		0		0	5,750	Montana Rail Services
		tear out turnouts and stockpile	5	ea	750.00	3,750		0		0	3,750	Montana Rail Services
		remove ties and stockpile	2,600	ea	0.75	1,950		0		0	1,950	Montana Rail Services
		Power wash ties	2,600	ea	2.50	6,500		0		0	6,500	Montana Rail Services
		Power wash rails	120	ea	5.00	600		0		0	600	Montana Rail Services
		Mobilization	1	ls		0		0	7,200	7,200	7,200	Montana Rail Services
						0		0		0	0	
		rail removal days w/decon	16			0		0		0	0	K/J est
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
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						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
		Air Monitoring Labor/Work Zone	16	day		0	700.00	11,200		0	11,200	EMR ($70 x 10 hours/day)
		Air Monitoring Lab/Work Zone	16	day	570.00	9,120		0		0	9,120	EMR
Subtotals						27,670		11,200		7,200	46,070	

Remove rails and ties, decon rails and ties 46,070 Options 4, 5, 6

Remove and decon rails, leave ties 38,970 Options 3A, 3B

ENGINEER'S ESTIMATE OF PROBABLE COST **KENNEDY/JENKS CONSULTANTS**

Project: BNSF Libby Railyard Evaluation of Conceptual Response Options

Option Description: Link 3 - Linked Cost to Remove West Spurs

Prepared By: CHS
Date Prepared: 9-Mar-04
K/J Proj. No. 46022.11

Current at ENR ______
Escalated to ENR ______

Estimate Type:
[X] Conceptual
[ ] Preliminary (w/o plans)
[ ] Design Development @ ______ % Complete
[ ] Construction
[ ] Change Order

Spec. Section	Item No.	Description	Qty	Units	Materials $/Unit	Materials Total	Labor and $/Unit	Labor Total	Sub-contractor $/Unit	Sub-contractor Total	Total	Source
		Remove rails	380	ft	1.25	475		0		0	475	Montana Rail Services
		tear out turnouts and stockpile	1	ea	750.00	750		0		0	750	Montana Rail Services
		remove ties and stockpile	215	ea	0.75	161		0		0	161	Montana Rail Services
		Power wash ties	215	ea	2.50	538		0		0	538	Montana Rail Services
		Power wash rails	10	ea	5.00	50		0		0	50	Montana Rail Services
						0		0		0	0	
		40-hour training (6 men)	1	ls		0		0	8,700	8,700	8,700	Montana Rail Services
		Rail removal days w/decon	2			0		0		0	0	K/J est
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
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						0		0		0	0	
		Air Monitoring Labor/Work Zone	2	day		0	700.00	1,400		0	1,400	EMR ($70 x 10 hours/day)
		Air Monitoring Lab/Work Zone	2	day	570.00	1,140		0		0	1,140	EMR
Subtotals						3,114		1,400		8,700	13,214	

Remove rails and ties, decon rails and ties 13,214 Option 6

Remove and decon rails, leave ties 12,515 Options 2A, 2B, 3A, 3B, 4, 5

ENGINEER'S ESTIMATE OF PROBABLE COST

KENNEDY/JENKS CONSULTANTS

Project: BNSF Libby Railyard Evaluation of Conceptual Response Options

Option Description: Link 4 - Linked Cost to Remove Track 5

Prepared By: CHS
Date Prepared: 9-Mar-04
K/J Proj. No. 46022.11

Current at ENR ______
Escalated to ENR ______

Estimate Type: [X] Conceptual [ ] Construction
[ ] Preliminary (w/o plans) [ ] Change Order
[ ] Design Development @ ______ % Complete

Spec. Section	Item No.	Description	Qty	Units	Materials $/Unit	Materials Total	Labor and $/Unit	Labor Total	Sub-contractor $/Unit	Sub-contractor Total	Total	Source
		Remove rails	1,110	ft	1.25	1,388		0		0	1,388	Montana Rail Services
		tear out turnouts and stockpile	0	ea	750.00	0		0		0	0	Montana Rail Services
		remove ties and stockpile	625	ea	0.75	469		0		0	469	Montana Rail Services
		Power wash ties	625	ea	2.50	1,563		0		0	1,563	Montana Rail Services
		Power wash rails	30	ea	5.00	150		0		0	150	Montana Rail Services
		rail removal days w/decon	4			0		0		0	0	K/J est
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
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						0		0		0	0	
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						0		0		0	0	
		Air Monitoring Labor/Work Zone	4	day		0	700.00	2,800		0	2,800	EMR ($70 x 10 hours/day)
		Air Monitoring Lab/Work Zone	4	day	570.00	2,280		0		0	2,280	EMR
Subtotals						5,849		2,800		0	8,649	

Remove rails and ties, decon rails and ties 8,649 Option 6

Link 4
Remove Track 5

ENGINEER'S ESTIMATE OF PROBABLE COST **KENNEDY/JENKS CONSULTANTS**

Project: BNSF Libby Railyard Evaluation of Conceptual Response Options

Option Description: Link 5 - Linked Cost to Remove Track 5, Leave Ties, and Cap

Prepared By: CHS
Date Prepared: 9-Mar-04
K/J Proj. No. 46022.11

Current at ENR ______
Escalated to ENR ______

Estimate Type:
[X] Conceptual
[ ] Preliminary (w/o plans)
[ ] Design Development @ ______ % Complete
[ ] Construction
[ ] Change Order

Spec. Section	Item No.	Description	Qty	Units	Materials $/Unit	Materials Total	Labor and $/Unit	Labor Total	Sub-contractor $/Unit	Sub-contractor Total	Total	Source
		Remove rails	1,110	ft	1.25	1,388		0		0	1,388	Montana Rail Services
		tear out turnouts and stockpile	0	ea	750.00	0		0		0	0	Montana Rail Services
		remove ties and stockpile	0	ea	0.75	0		0		0	0	Montana Rail Services
		Power wash ties	0	ea	2.50	0		0		0	0	Montana Rail Services
		Power wash rails	30	ea	5.00	150		0		0	150	Montana Rail Services
		rail removal days w/decon	3			0		0		0	0	K/J est
						0		0		0	0	
		Area to cap	14,498	sq ft		0		0		0	0	EMR & K/J
		grade site	14,498	sq ft	0.07	967		0		0	967	
		place geotextile	14,498	sq ft	0.20	2,900		0		0	2,900	2001 Wilder bid for Butte
		cap with 12 inches of local rock - includes delivery and spread	805	ton	6.64	5,348		0		0	5,348	Crushed rock road subbase from Libby supplier
		compaction of 12" cap, 6" lifts	948	LCY		0		0		0	0	Cost RS Means, assumed 85% compaction
	26	grade 6" lifts, 2 passes	28,996	sq ft	0.07	1,933		0		0	1,933	Cost RS Means
						0		0		0	0	
		capping days	3			0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
						0		0		0	0	
		Air Monitoring Labor/Work Zone	6	day		0	700.00	4,200		0	4,200	EMR ($70 x 10 hours/day)
		Air Monitoring Lab/Work Zone	6	day	570.00	3,420		0		0	3,420	EMR
Subtotals						16,105		4,200		0	20,305	

Remove and decon rails, leave ties 20,305 Options 2A, 2B, 3A, 3B, 4, 5